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Architecture Design

Analyzing Amazon Sales Data

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1. Introduction

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.
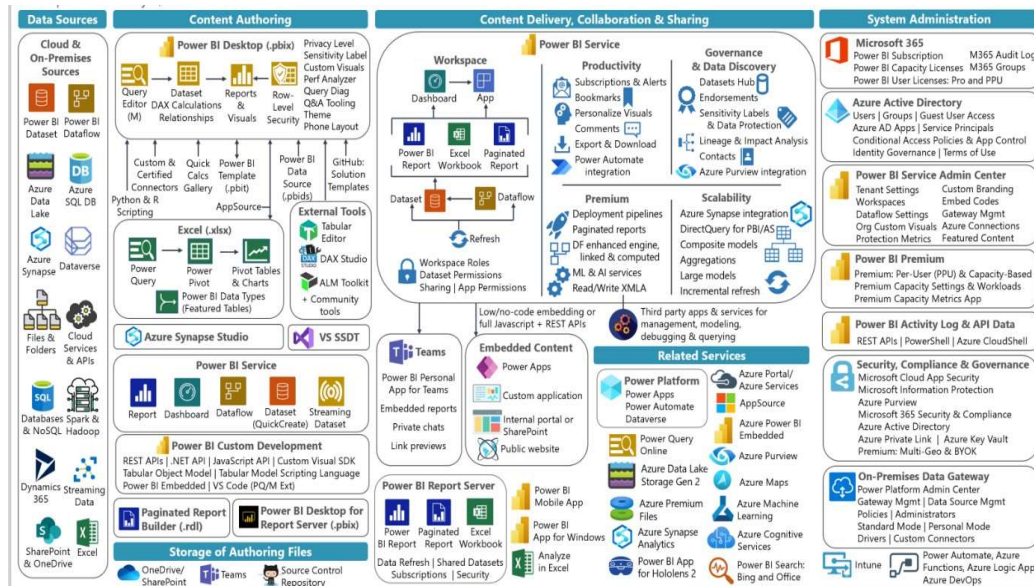
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2. Architecture of Power BI

Photo: (3)

Power BI is a business intelligence platform created by Microsoft. It is used for business analytics, data visualization and it presents actionable information from raw data.

With the help of Power BI we can create customizable dashboards and we can view up-to-date data because it supports real-time data processing. Power BI also gives the opportunity to collaborate and work on data analysis models project together.

Power BI has some disadvantages as well: it has limited processing capabilities, limited customization options and it is not a free tool, users have to pay for additional features and for storage space.
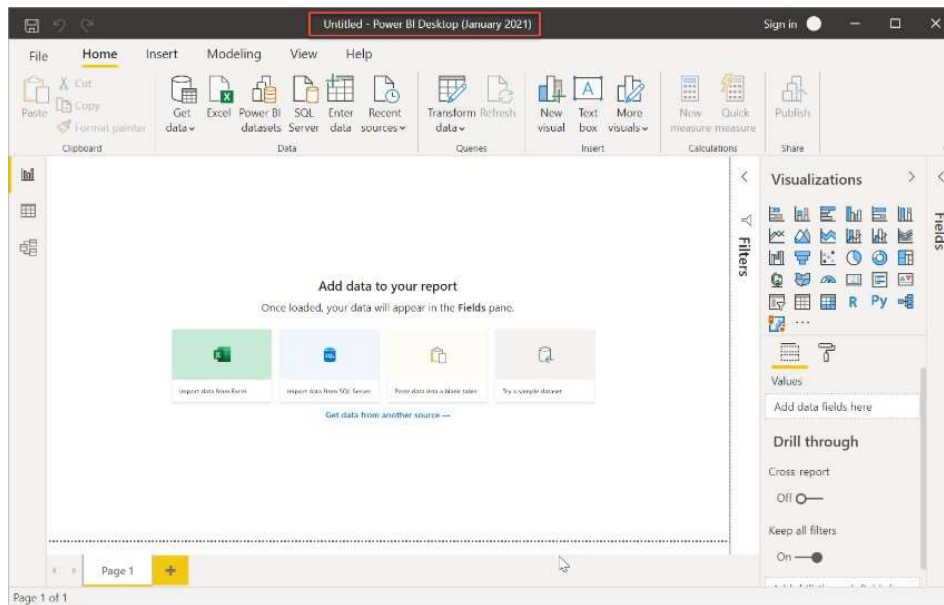
Power BI technology has more components such as: Power Query, Power Pivot, Power View, Power Map, Power BI Desktop, Power BI Mobile, Power Q&A (1).

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2.1.Data Sources

Power BI has a user-friendly surface, and it is very helpful with data integration. Data can be integrated from various sources: excel, text/csv, xml, json, web files, Oracle Database, IBM DB2 Database, MySQL Database, PostgreSQL Database, Sybase Database, Teradata Database, SAP Business Warehouse Server, SAP HANA Database, Amazon Redshift, Impala, Google BigQuery, Azure SQL Database, Salesforce Reports, Facebook, GitHub, Google Analytics (2).
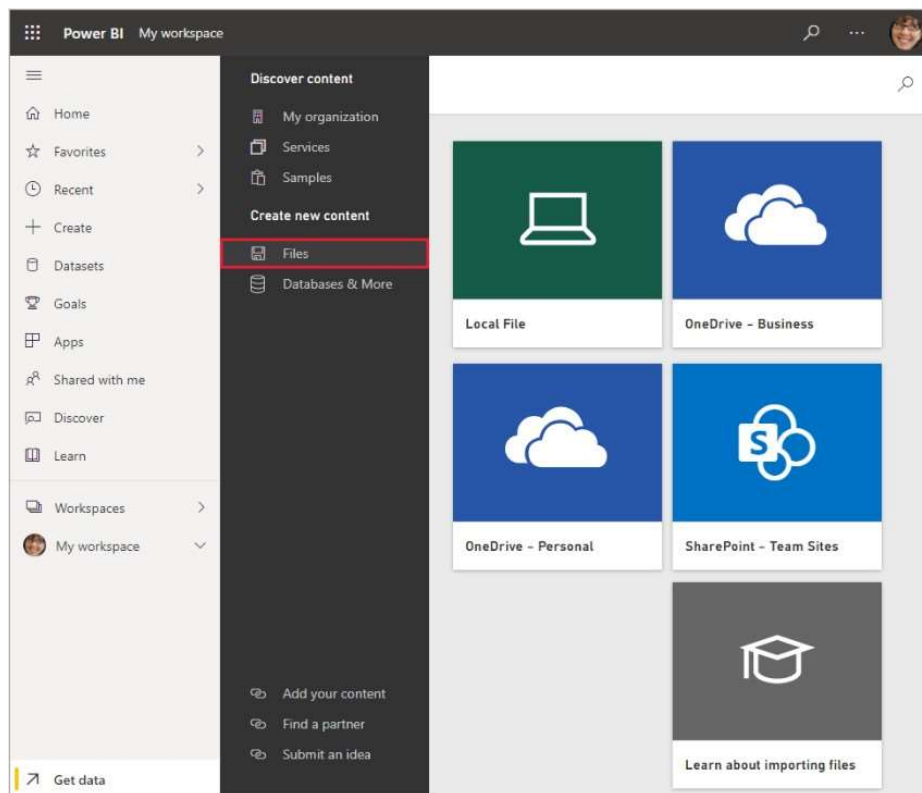
2.2.Power BI Desktop

Power BI Desktop is a free-tool that is used for data analysis and report authoring. Power BI users can connect to various data sources, transform and model data, create charts and graphs, create reports and dashboards, share reports and collaborate with each other (4).

Picture: (5)

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2.3. Power BI Service

Power BI Service is a cloud-based business analytics and data visualization platform. The main features of Power BI Service: Navigation Pane, Canvas, Q&A Question Box, Icon Buttons, Dashboard Title, Office 365 App Launcher, Power BI Home Button, Labeled Icon Buttons (6).

Picture: (7)

Power BI Service has 2 sections: Front End Cluster, Back End Cluster.

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" (12).

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" (12).
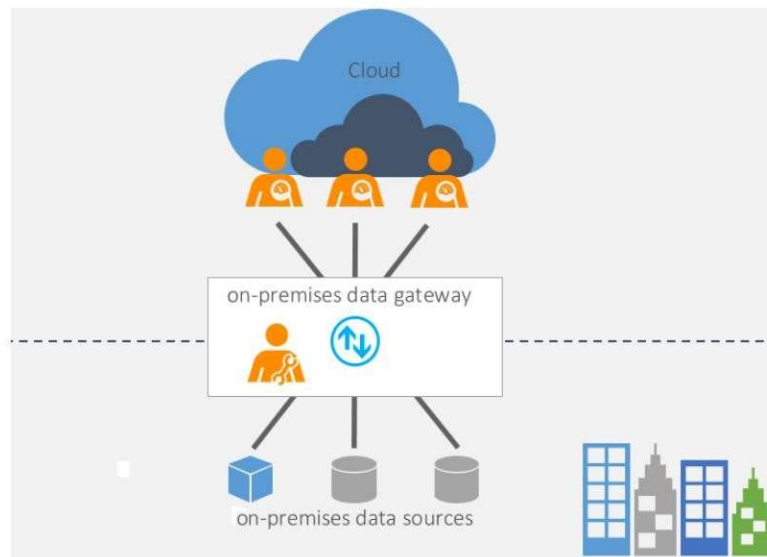
2.4. Power BI Report Server

Power BI Report Server is an on-premises report platform that hosts Power BI Reports. The reports are displayed to the users through a web portal. This platform is built on SQL Server Reporting Service's architecture, users can host paginated reports, mobile reports and KPIs as well (8).

2.5. Power BI Gateway

Power BI Gateway is an application that connects Power BI cloud-based technology and the data source on-premises (9).

The diagram below shows the role of the gateway in connection;
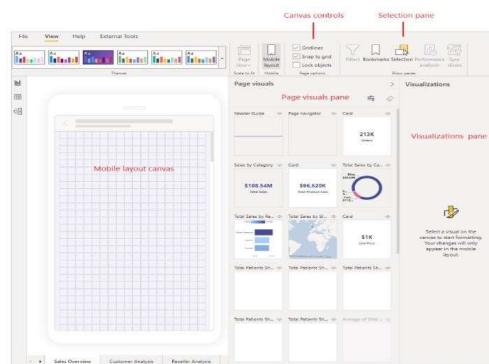

Picture: (9)

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Types of Gateways:

	Personal Mode	On-premises Mode
Target Persona	Business Analyst who wants to set up and use gateway to run his/her reports	BI Admins to set up the gateway for their companies Multiple BI developers to use the gateway for their reports
Usage	Analyst	BI Admin Developer
Connection Type	Import Data or Scheduled Refresh	Import Data or Schedule Refresh Live Connection DirectQuery
Management	Per user data source management	Central data source management
Monitoring/Control	No monitoring/Control	Central Monitoring and Control
Services Supported	Power BI only	Power BI PowerApps Microsoft Flow Azure Logic Apps

Picture: (9)

2.6. Power BI Mobile

Power BI Mobile is a Power BI application that can be used from mobile (iOS, Android, Window). It is used for viewing reports and dashboards (10).

Picture: (10)

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2.7. Power BI Embedded

Power BI Embedded is an Azure Service, it allows the user to embed his Power BI items, for example tiles, reports or dashboards (11).

3. References

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