Architecture Design

Analyzing Amazon Sales Data

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Harshit Kumar Pathak

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**1. Introduction**

**1.1 What is Architecture Design Document?**

Any software needs the architectural design to 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 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:

1. A set of components (e. g: a database, computational modules) that will perform a function required by the system.

2. The set of connectors will help in coordination, communication, and cooperation between the components.

3. Conditions that how components can be integrated to form the system.

4. Semantic models help the designer to understand the overall properties of the system.

**1.2 Scope**  Architecture Design Document (ADD) is an architectural 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**

**2.1 Power BI Architecture**

Microsoft’s Power BI is a collection of Business Intelligence tools such as apps, software services, and connectors that can turn raw business data into visual insights. The raw data could be from Excel spreadsheets, database tables, or a collection of cloud-based hybrid datasets.

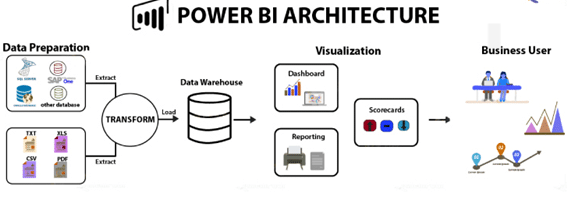
The role of Power BI mostly depends on the projects or the teams in an organization. It can be used to view reports and dashboards, monitor progress on sales, find new lead details, and analyze market behaviour. This BI tool also helps an organization plan its future actions by predicting market behaviour.

To deliver outstanding business intelligence solutions. Microsoft Power BI technology consists of a group of components such as:

1. Power Query (for data mash-up and transformation)
2. Power BI Desktop (a companion development tool)
3. Power BI Mobile (for Android, iOS, Windows phones)
4. Power Pivot (for in-memory tabular data modelling)
5. Power View (for viewing data visualizations)
6. Power Map (for visualizing 3D geo-spatial data)
7. Power Q&A (for natural language Q&A)

In simple terms, a Power BI user takes data from various data sources such as **files, Azure source, online services, DirectQuery or gateway sources.** Then, they work with that data on a client development tool such as ***Power BI Desktop.*** Here, the imported data is cleaned and transformed according to the user’s needs.

Once the data is transformed and formatted, it is ready to use in making visualizations in a report. A report is a collection of visualizations like graphs, charts, tables, filters, and slicers.



**2.2 Components of Power BI Architecture**

**1.** **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. Some commonly used data sources in Power BI are:

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

**2.** **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 creating reports.

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.

**3. 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:

a. Free version

b. Pro version

c. Premium version

**4. 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.

#### 5. 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 out such data through secure channels to Power BI platforms for analysis and reporting.

#### 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.

#### 7. Power BI Embedded - Power BI Embedded offers APIs which are used to embed visuals into custom applications.

**3. Deployment**

Deployment is the process of making a software application available for use. This involves making the application available on a server or other environment where it can be accessed by users. Power BI deployment is the process of making Power BI content available to users. There are a few different ways to deploy Power BI content, but the most common methods are manual deployment and automated deployment.

**3.1** **PowerBI Manual Deployment**

Manual deployment is the simplest method of deployment. It involves manually uploading Power BI content to the Power BI service. To manually deploy Power BI content, you will need to follow these steps:

* Create the Power BI content in Power BI Desktop.
* Export the Power BI content to a .pbix file.
* Log in to the Power BI service web portal.
* Click the Upload button.
* Select the .pbix file that you exported from Power BI Desktop.
* Click the Upload button.

Once the .pbix file is uploaded, it will be available to users in the Power BI service.

**3.2** **PowerBI Automatic Deployment**

Automated deployment is a more complex method of deployment, but it is more efficient and scalable. It involves using the Power BI deployment pipelines tool to automate the deployment of Power BI content. To automate the deployment of Power BI content, you will need to follow these steps:

* Create a deployment pipeline in the Power BI deployment pipelines tool.
* Configure the deployment pipeline to include the steps that you want to take to deploy the Power BI content.
* Schedule the deployment pipeline to run automatically.

Once the deployment pipeline is created and scheduled, it will automatically deploy the Power BI content to the Power BI service. This ensures that the Power BI content is always up-to-date.