

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:

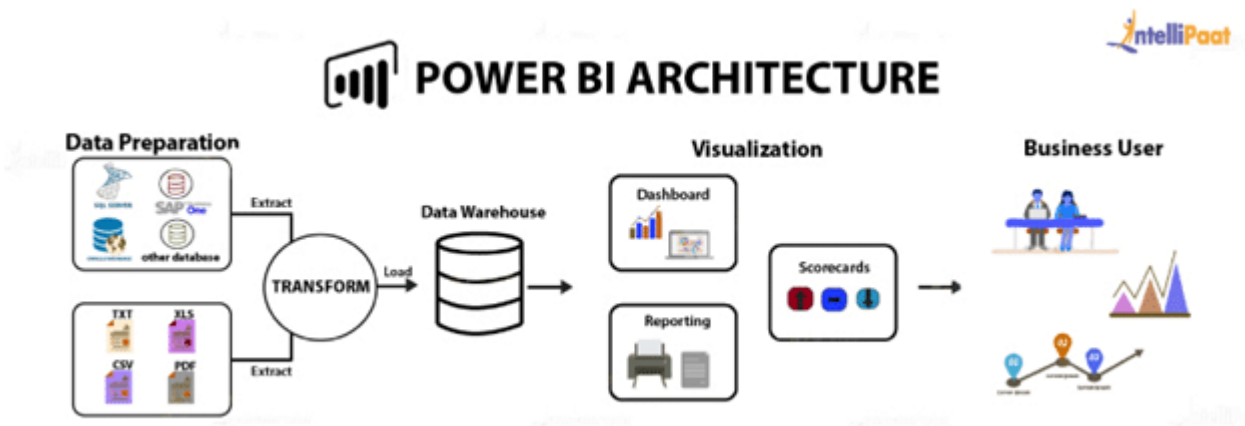
- A set of components (e.g.: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic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

MS Power BI architecture consists of four major steps that explain the whole process from data sourcing to the creation of reports and dashboards. Various technologies and processes work together to get the required results with extreme precision. Let's see those steps further.



- **Sourcing data:** Power BI extracts data from various servers, Excel sheets, CSV files, and databases. The extracted information can be directly imported to Power BI, or a live service link is established to receive it. If you directly import the data in Power BI, it will only be compressed up to 1 GB. Post that, you can only run live queries on your chunky datasets.
- **Transforming the data:** Before visualizing the data, cleaning and pre-processing it should be done. This means removing useless or missing values from rows or columns. Following that, certain rules will be applied to transform and load the datasets into the warehouse.
- **Report and publish:** After cleaning and transforming the data, reports will be created based on requirements. A report is a visualization of the data with different filters and constraints presented in the form of graphs, pie charts, and other figures.
- **Creating dashboards:** Power BI Dashboards are created by pinning individual elements or pages of live reports. Dashboards should be created after you have published your reports to the BI service. When the reports get saved, the visual maintains the filter settings chosen so that the user can apply filters and slicers.

2.1 Working of Power BI Architecture

The architecture is mainly divided into two parts: On-cloud and on-premises services. It will be clearer from the image. You can also consider it as a Power BI data flow Diagram that helps you understand the flow of data from On-premises to On-cloud server applications. At the top, you will see data sources such as web browsers, Excel sheets, and other sources that feed information to various Power BI components. Power BI has various data sources, including direct connections, in-house servers, cloud databases, and more. Best practices of Power BI architecture help you create stunning reports for better business analytics.

On-premises

Here, all kinds of reports published in the Power BI Report Server are distributed to the end-user. Power Publisher enables the user to publish Excel workbooks to Power BI Report Server. Report Server and Publisher tools help you create datasets, paginated reports, mobile reports, and more.

On-cloud

In the Power BI Gateway architecture, the BI gateway acts as a bridge in transferring data from on-premises data sources to on-cloud servers or applications. The cloud consists of various components such as dashboards, datasets, reports, Power BI Embedded, etc. These on-cloud data sources are connected with the Power BI tools.

Power BI Service Architecture

Now, you will move on to understanding the service architecture. It is based on two clusters. Let's briefly discuss them further:

The Front-end Cluster

The front-end cluster acts as a medium between the client and the on-cloud servers in the Power BI data flow diagram. After the initial connection and authentication using Azure Active Directory, the client can interact with the datasets located across the globe.

The Back-end Cluster

The back-end cluster manages datasets, storage, reports, visualizations, data connections, data refreshing, and other services in Power BI. At the cluster, web clients have only two points to interact with the information, i.e., Azure API Management and Gateway Role. These components are responsible for authorizing, routing, authentication, load balancing, etc.

Now that you know about the Power BI architecture and its works, let's discuss the Power BI dashboard and the unique features of Power BI.

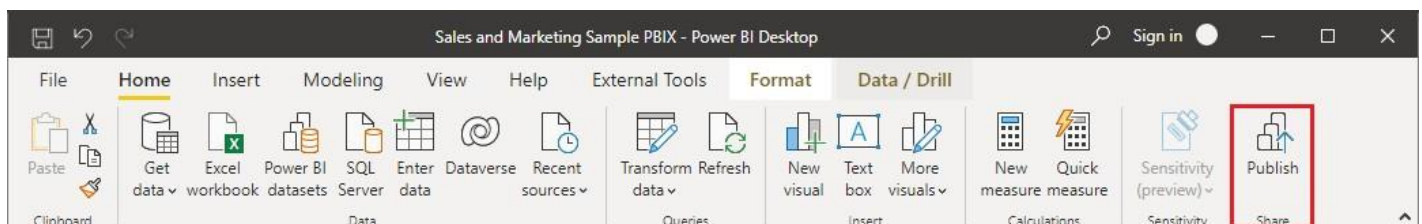
3. Deployment:

Git Hub: It is an online software development platform used for storing, tracking, and collaborating on software projects. It enables developers to upload their own code files and to collaborate with fellow developers on open-source projects

Power BI Service: Report Server gives your users access to rich, interactive reports, and the enterprise reporting capabilities of SQL Server Reporting Services. Explore visual data and quickly discover patterns to make better, faster decisions. At the same time, generate pixel-perfect paginated reports your business needs. You also have the ability to confidently scale to thousands of users because Power BI Report Server is based on a proven, enterprise-grade platform.

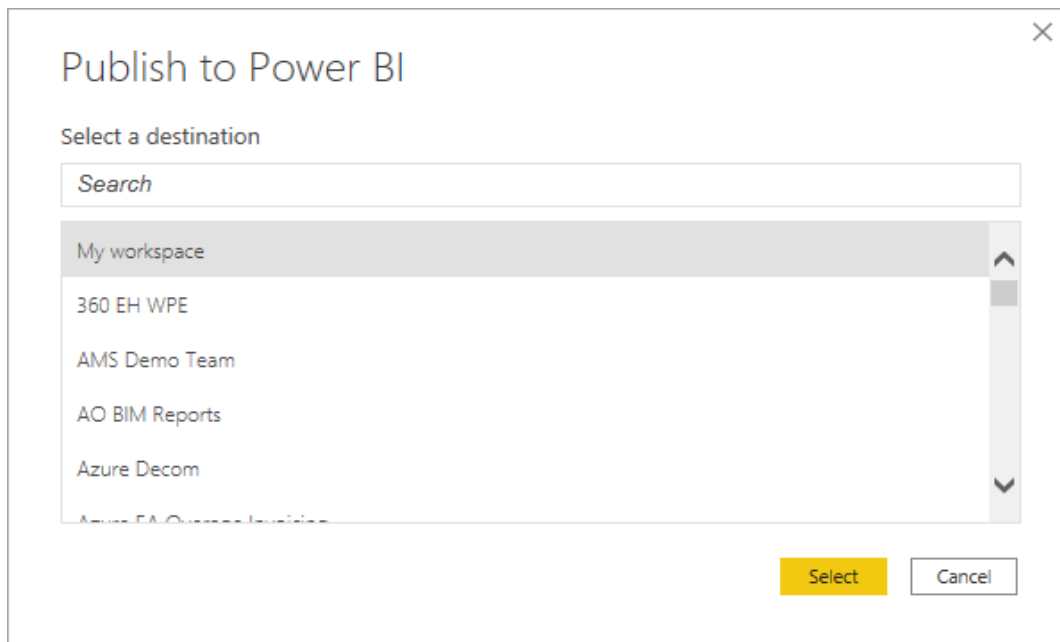
Steps For Publishing the Dashboard:

In Power BI Desktop, choose **File > Publish > Publish to Power BI** or select **Publish** on the **Home** ribbon.



Sign in to Power BI, if you aren't already signed in, Select the destination. You can search your list of available workspaces to find the workspace into which you want to publish. The search box lets you filter your workspaces. Select

the workspace, and then click the **Select** button to publish



When publishing is complete, you receive a link to your report. Select the link to open the report in your Power BI site.

