# ARCHITECTURE DOCUMENT

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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:

- 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 help the designer to understand the overall properties of the system.

## 1.2 What is Scope?

1.1 What is Architecture Design Document?

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

Power BI is a business suite that includes several technologies that work together. To deliver outstanding business intelligence solutions. Microsoft Power BI technology consists of a group of components such as:

a) Power Query (for data mash-up and transformation)
b) Power BI Desktop (a companion development tool)
c) Power BI Mobile (for Android, iOS, Windows phones)
d) Power Pivot (for in-memory tabular data modelling)
e) Power View (for viewing data visualizations)
f) Power Map (for visualizing 3D geo-spatial data)
g) 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, Direct Query 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:

a) Excel
b) Text/CSV
c) XML
d) JSON
e) Oracle Database
f) IBM DB2 Database
g) MySQL Database
h) PostgreSQL Database
i) Sybase Database
j) Teradata Database
k) SAP HANA Database
l) SAP Business Warehouse server
m) Amazon Redshift
n) Impala
o) Google Big Query (Beta)
p) Azure SQL Database
q) Salesforce Reports
r) Google Analytics
s) Facebook
t) 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 modelling and create 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:

Free version
Pro version
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.

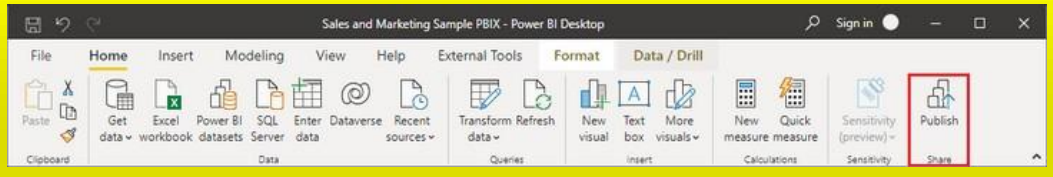
## 3. Deployment

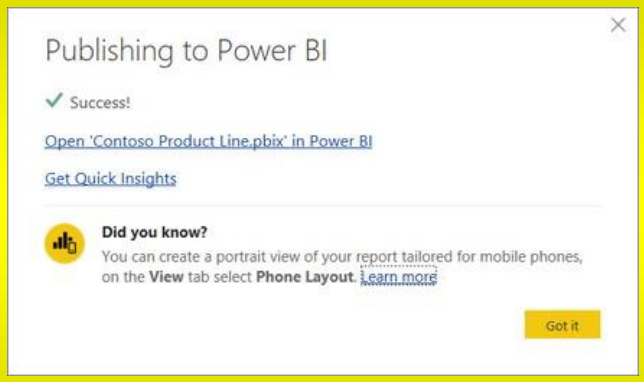
### 3.1 Power BI Deployment

The deployment process lets you clone content from one stage in the pipeline to another, typically from development to test, and from test to production. During deployment, Power BI copies the content from the current stage, into the target one. The connections between the copied items are kept during the copy process. Power BI also applies the configured deployment rules to the updated content in the target stage. Deploying content may take a while, depending on the number of items being deployed. During this time, you can navigate to other pages in the Power BI portal, but you cannot use the content in the target stage.

### 3.2 Publish datasets and reports from Power BI Desktop

When you publish a Power BI Desktop file to the Power BI service, you publish the data in the model to your Power BI workspace. The same is true for any reports you created in Report view. You'll see a new dataset with the same name, and any reports in your Workspace navigator. Publishing from Power BI Desktop has the same effect as using Get Data in Power BI to connect to and upload a Power BI Desktop file



# POWER BI

# Power BI Introduction

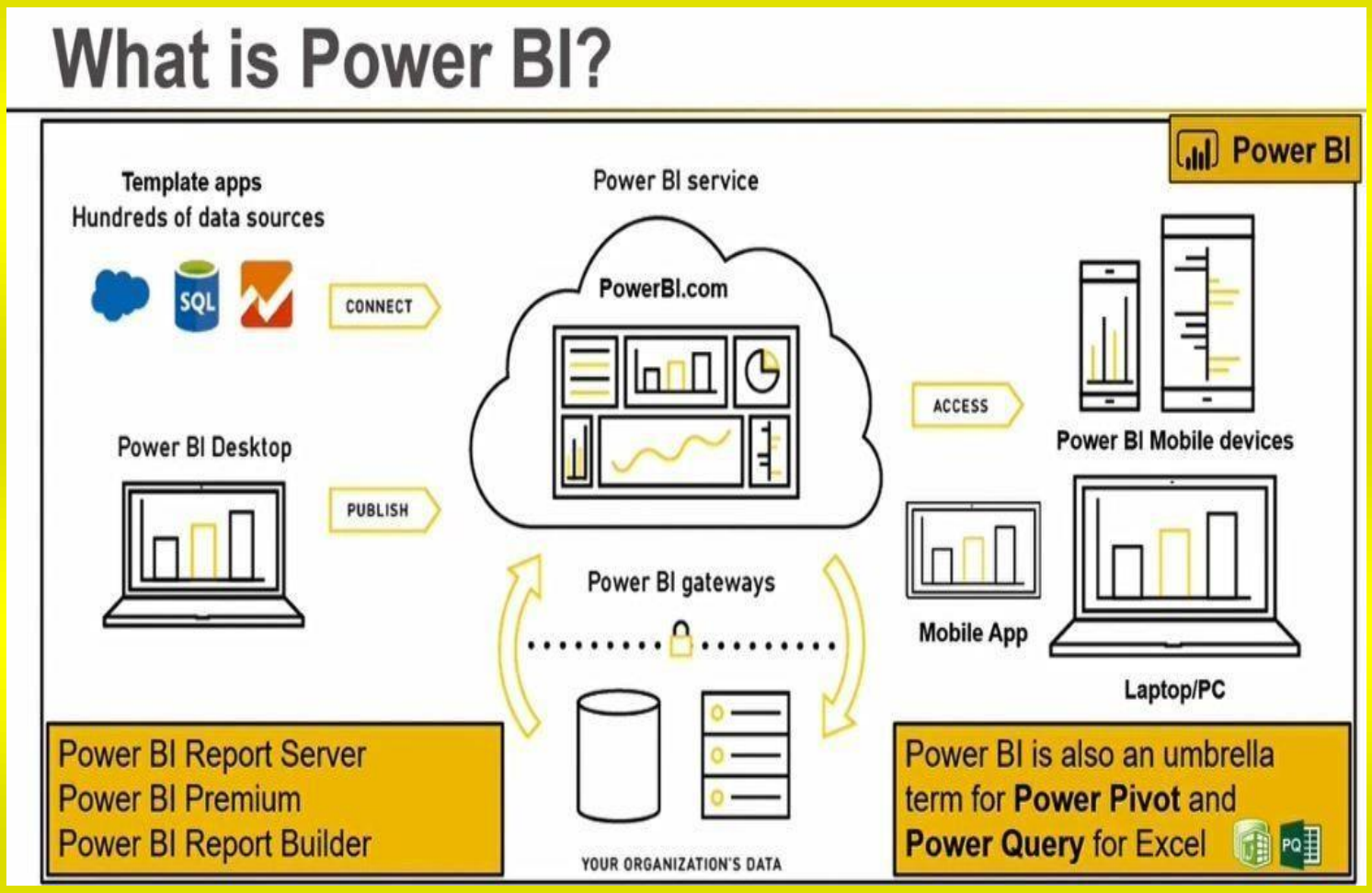
- Business intelligence (BI) is an umbrella term that includes the applications, infrastructure and tools, and best practices that enable access to and analysis of information to improve and optimize decisionsand performance –Gartner

- Business intelligence (BI) is a technology-driven process for analyzing data and presenting actionable information to help corporate executives, business managers andother end users make more informed business decisions.

- Business intelligence (BI) is the set of techniques and tools for the transformation of raw data into meaningful and useful information for business analysis purposes.

- Business intelligence (BI) represents the tools, systems and software that play a keyrole in the strategic planning process of the corporation.

- Business intelligence (BI) is the use of computing technologies for the identification, discovery and analysis of business data - like sales revenue, products, costs and incomes.



## Self-service Business Intelligence

Self-service business intelligence (BI) is an approach to data analytics that enables business users to access and work with corporate data even if they do not have a background in statistical analysis, BI or Data Mining.

Self-service BI tools allow users to filter, sort, analyze and visualize data without involving the organization's BI and IT teams.

## Traditional vs. self-service BI

With traditional BI tools, data scientists and IT teams control access to data. Users requesting new reports and dashboards submit a list of business requirements; once the project is approved -- which can take weeks -- the data is extracted, transformed and loaded into an operational data warehouse. The IT or BI team then produces the report or dashboard.

Conversely, a self-service BI architecture is used by people who may not be tech-savvy; therefore, it is imperative that the user interface (UI) for self-service analytics software be intuitive. User-friendly dashboards and navigation should address the needs of both casual users (those who may need to access data but not generate reports) and power users (more savvy users, responsible for not just accessing and analyzing the data, but also ad hoc reporting). Ideally, training should be provided to help users understand what data is available and how that information can be queried to make data-driven decisions to solve business problems.

Once the IT department has set up the data warehouse and data marts that support the BI system, business users should then be able to query the data and create personalized reports with little effort.

# Power BI

Power BI is a business analytics solution that lets you visualize your data and share insights across your organization, or embed them in your app or website. Connect to hundreds of data sources and bring your data to life with live dashboards and reports.

It provides interactive visualizations with self-service business intelligence capabilities, where end users can create reports and dashboards by themselves, without having to depend on any information technology staff or database administrator.

# History

The initial preview Power BI was unveiled by Microsoft in September 2013 as Power BI for Office 365.The first release of Power BI was based on the Microsoft Excel–based add-ins: **Power Query, Power Pivot** and **Power View**. With time, Microsoft also added many additional features like Question and Answers, enterprise level data connectivity and security options via Power BI Gateways. Power BI was first released to the general public on July 24, 2015.

## See your data in new ways

Make informed decisions quickly. Connect, model, and then explore your data with visual reports that you can collaborate, publish, and share. Power BI integrates with other tools, including Microsoft Excel, so you can get up to speed quickly and work seamlessly with your existing solutions

## Create

Connect to your data wherever it lives. Then explore your data with stunning interactive visualizations.

# Collaborate and share

Publish reports and dashboards, collaborate with your team, and share insights inside and outside of your organization.

## Go from data to insights in minutes with Power BI Desktop.

- Connect to hundreds of data sources on premises and inthe cloud.
- Use **Power Query** to simplify data ingestion, transformation, integration, and enrichment.
- Create reports using built-in visuals, or create your own custom visuals.

## Use Power BI Pro to create a data culture in your organization.

- Collaborate with users in every role across your organization.
- Publish real-time content that users can access in theoffice or on the go.
- Centrally manage your organization's business intelligence.

# Power BI Premium lets you distribute reports without purchasing individual licenses.

- See up-to-date business data on the go with the Power BI Mobile app, and set data-driven alerts about important insights so you can act right away.
- Developing your own app? Embed interactive reports into your current build with Power BI Embedded.

- Share content broadly inside and outside of your organization.
- Scale when you're ready, with even more capacity allocated exclusively to you.
- Enjoy the flexibility and easy deployment that only comes with a true SaaS service.

# Power BI Desktop

## Report authoring made easy

## Connect to your data, wherever it is

Access data from hundreds of supported **on-premises and cloud-based sources**, such as Dynamics 365, Salesforce, Azure SQL DB, Excel, and SharePoint. Ensure it's always up to date with automated, incremental refreshes. Power BI Desktop enables you to develop deep, actionable insights for a broad range of scenarios.

## Prep and model your data with ease

Data prep can take most of your time, but it doesn't have to with data modeling tools. Reclaim hours in your day using the self-service Power Query experience familiar to millions of Excel users. Ingest, transform, integrate and enrich data in Power BI.

## Provide advanced analytics with the familiarity of Excel

Dig deeper into data and find patterns you may have otherwise missed that lead to actionable insights. Use features like quick measures, grouping, forecasting, and clustering. Give advanced users full control over their model using powerful DAX formula language. If you're familiar with Excel, you'll feel at home in Power BI.

# Create interactive reports customized for your business

Create stunning reports with interactive data visualizations. Tell your data story using a drag-and-drop canvas and hundreds of modern data visuals from Microsoft and partners—or create your own, using the Power BI open source custom visuals framework. Design your report with theming, formatting, and layout tools.

## Author for everyone, anywhere

Get visual analytics to the people who need it. Create mobile-optimized reports for viewers to consume on the go. Publish from Power BI Desktop to the cloud or on-premises. Embed reports created in Power BI Desktop into existing apps or websites.

## Publish and share reports with Power BI Pro

Distribute and access insights anywhere by combining Power BI Desktop and Power BI Pro. Collaborate and build reports with colleagues and then publish and share those reports anytime, anywhere, and on any device.

# Power BI Software Family

Power BI(Desktop)

Power BI Pro (/Power Bi Premium)

Power Bi Service (Cloud)(SaaS)

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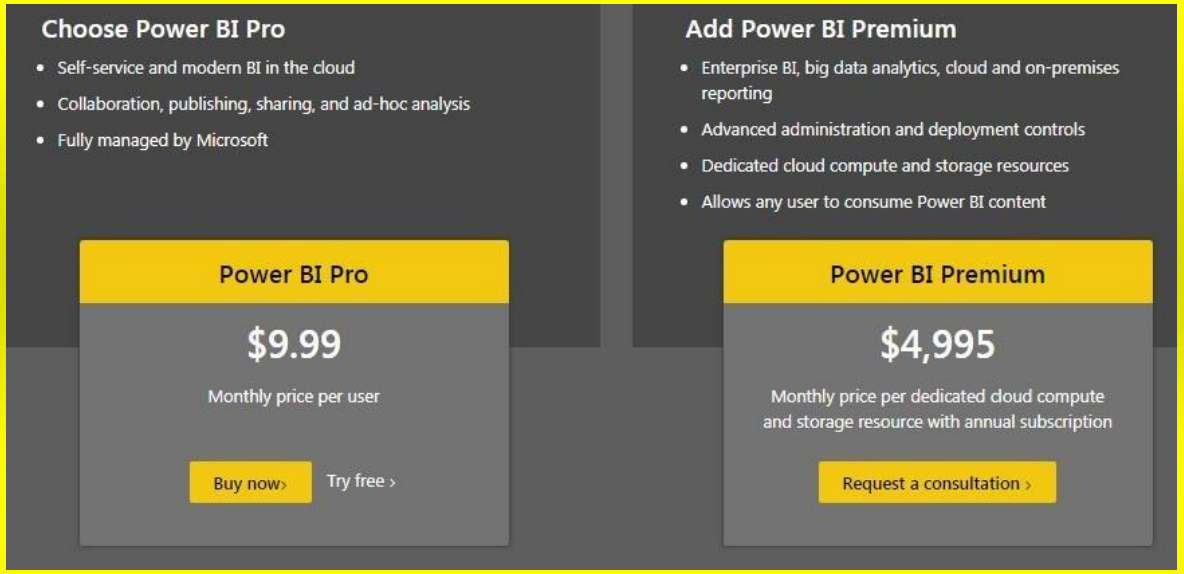
Power BI Desktop for Reporting Server

Power BI Reporting Server (On Premises)



## Link to download:

https://www.microsoft.com/en-us/download/details.aspx?id=58494

## Details

- **Note:** There are multiple files available for this download. Once you click on the "Download" button, you will be prompted to select the files you need.

- **Microsoft Power BI Desktop** is a companion desktop application to Power BI.

  With Power BI Desktop, you can:
  - Get data
    - The Power BI Desktop makes discovering data easy. You can import data from a wide variety of data sources. After you connect to a data source, you can shape the data to match your analysis and reporting needs.
  - Create relationships and enrich your data model with new measures and data formats
    - When you import two or more tables, oftentimes you'll need to create relationships between those tables. The Power BI Desktop includes the Manage Relationships dialog and the Relationships view, where you can use AutoDetect to let the Power BI Desktop find and create any relationships, or you can create them yourself. You can also very easily create your own measures and calculations or customize data formats and categories to enrich your data for additional insights.
  - Create reports
    - The Power BI Desktop includes the Report View. Select the fields you want, add filters, choose from dozens of visualizations, format your reports with custom colors, gradients and several other options. The Report View gives you the same great report and visualizations tools just like when creating a report on PowerBI.com.
  - Save your reports
    - With the Power BI Desktop, you can save your work as a Power BI Desktop file. Power BI Desktop files have a .pbix extension.
  - Upload or Publish your reports
    - You can upload the reports you created and saved in the Desktop to your Power BI site. You can also publish them to Power BI right from Power BI Desktop.

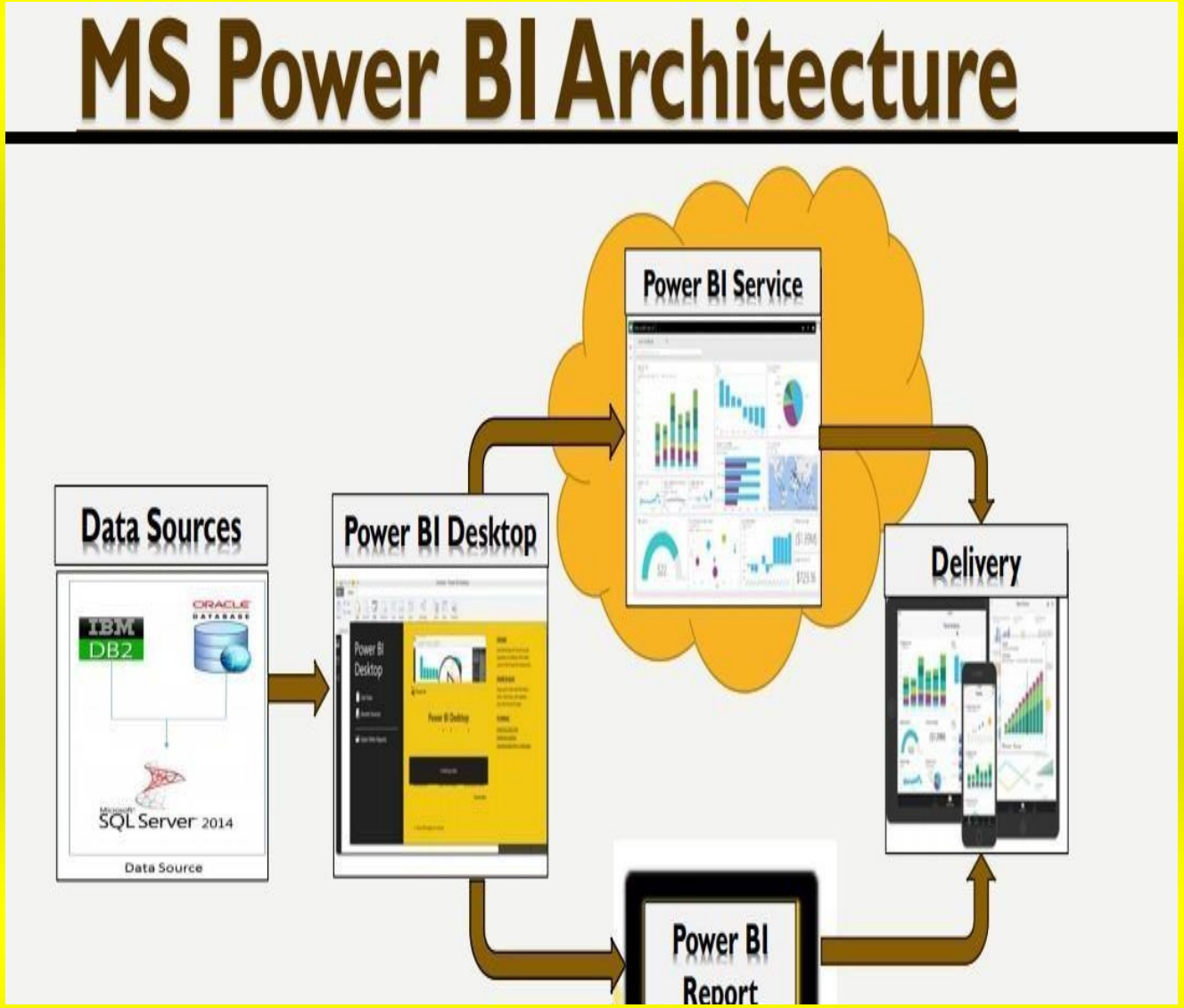
## System Requirements

- **Supported Operating System**

Windows 10, Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2

- Microsoft Power BI Desktop requires Internet Explorer 10 or greater.

Microsoft Power BI Desktop is available for 32-bit (x86) and 64-bit (x64) platforms.

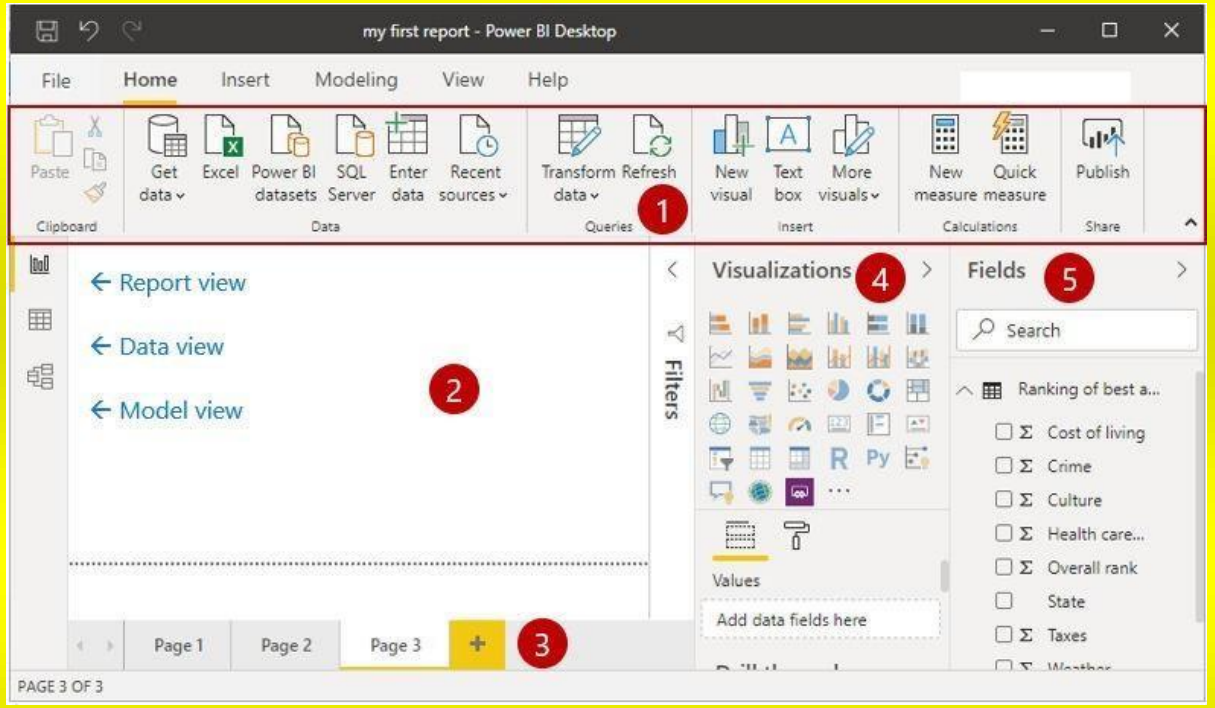


## Launch Power BI Desktop

When you launch Power BI Desktop, the **Getting Started** dialog box will appear, which provides useful links to forums, blogs, and introductory videos. Close this dialog box for now, but keep the **Show this screen on startup** option selected so that you can explore it later.

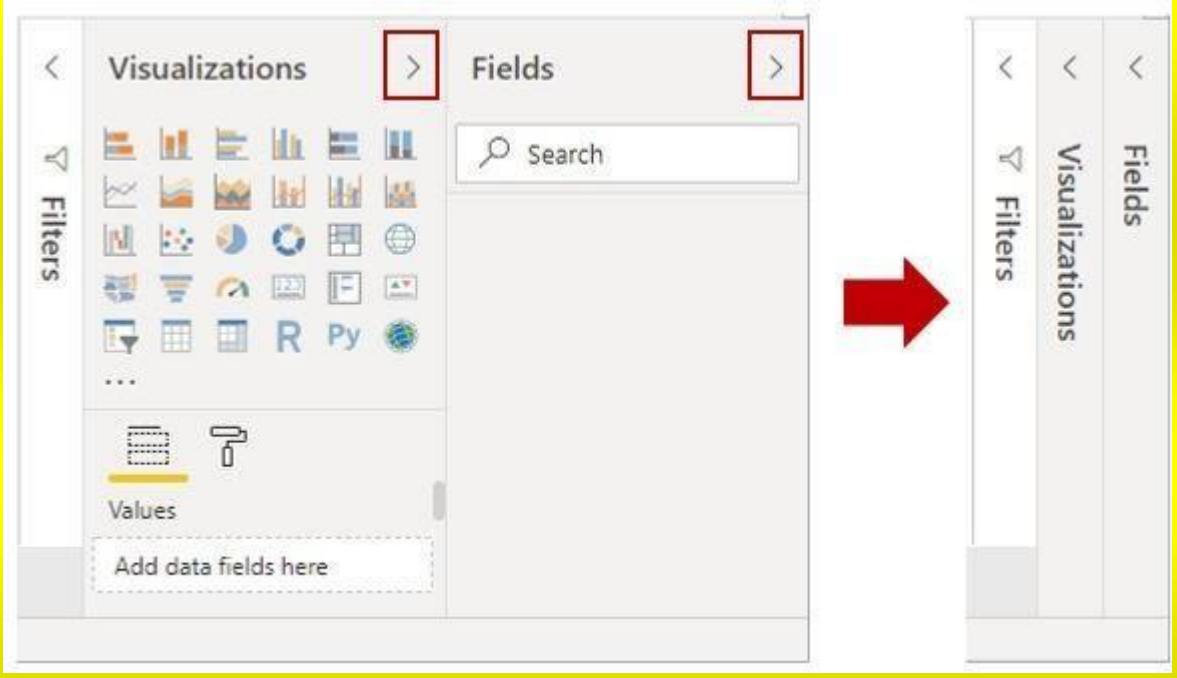
## Explore the report building environment

In Power BI Desktop, you'll begin to build reports in the **Report** view. You'll be working in five main areas:



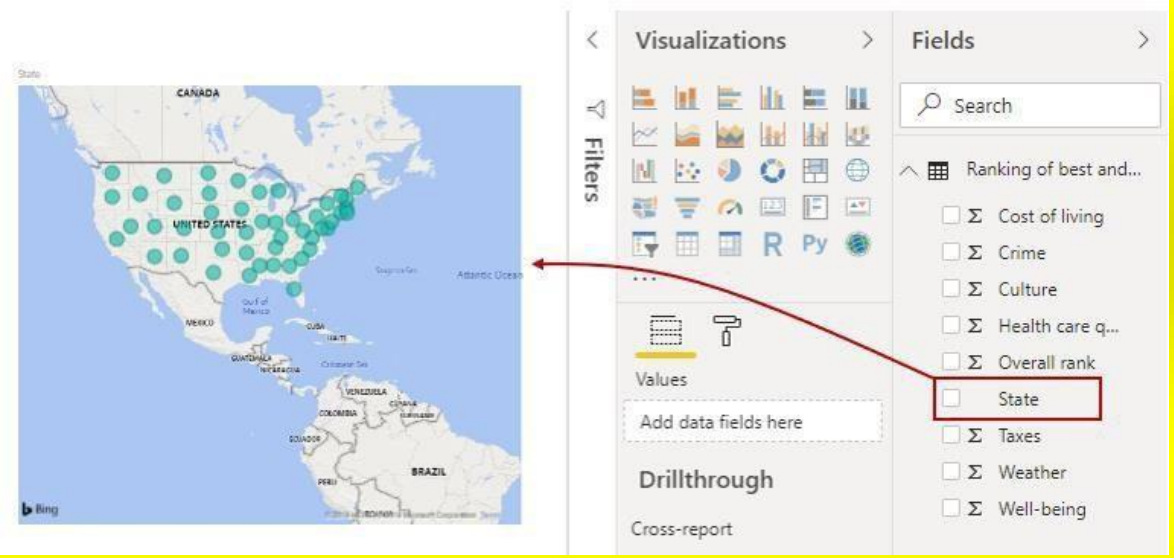

1. **Ribbon** - Displays common tasks that are associated with reports and visualizations.
2. **Report view, or canvas** - Where visualizations are created and arranged. You can switch between **Report**, **Data**, and **Model** views by selecting the icons in the left column.
3. **Pages tab** - Located along the bottom of the page, this area is where you would select or add a report page.
4. **Visualizations pane** - Where you can change visualizations, customize colors or axes, apply filters, drag fields, and more.

5. **Fields pane** - Where query elements and filters can be dragged onto the **Report** view or dragged to the **Filters** area of the Visualizations pane.



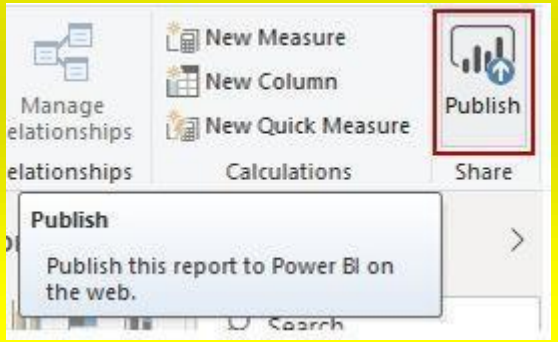

## Create a visual

To create a visual, drag a field from the **Fields** list onto the **Report** view.



# Publish a report

After creating a report with a few visuals, you're ready to publish to the Power BI service. On the **Home** ribbon on the Power BI Desktop, select **Publish**.




You'll be prompted to sign in to Power BI. When you've signed in and the publish process is complete, the following dialog box will appear. You can select the link below **Success!** which will take you to the Power BI service, where you can see the report that you published.