**Power BI Assignment 3**

1. List and explain different PowerBi products?

**Ans:** Following are the different PowerBi products..

1. Power BI Desktop — Free, intended for small to midsize businesses
2. Power BI Service-
   * Power BI Pro — Paid per-user license, needed to get access to advanced features and the ability to share reports
   * Power BI Premium — Licenses by scale, intended for large businesses and enterprises
3. Power BI Mobile — Device-based app for phones and tables
4. Power BI Embedded — A white-label version of Power BI which Independent Software Vendors can embed in their own apps, rather than build their own analytical features
5. Power BI Report Server — An on-premise version of the Power BI Desktop app for businesses that need to keep their data and reports on their own servers

## **Power BI Desktop**

*Power BI Desktop* is a free application you install on your local computer that lets you connect to, transform, and visualize your data. With Power BI Desktop, you can connect to multiple different sources of data, and combine them (often called *modeling*) into a data model. This data model lets you build visuals, and collections of visuals you can share as reports, with other people inside your organization. Most users who work on business intelligence projects use Power BI Desktop to create reports, and then use the *Power BI service* to share their reports with others.

The most common uses for Power BI Desktop are as follows:

* Connect to data.
* Transform and clean data to create a data model.
* Create visuals, such as charts or graphs that provide visual representations of the data.
* Create reports that are collections of visuals on one or more report pages.
* Share reports with others by using the Power BI service.

There are three views available in Power BI Desktop, which you select on the left side of the canvas. The views, shown in the order they appear, are as follows:

* Report: You create reports and visuals, where most of your creation time is spent.
* Data: You see the tables, measures, and other data used in the data model associated with your report, and transform the data for best use in the report's model.
* Model: You see and manage the relationships among tables in your data model.

To get started with Power BI Desktop, the first step is to connect to data. There are many different data sources you can connect to from Power BI Desktop.

To connect to data:

From the **Home** ribbon, select **Get Data** > **More**.

When you select a data type, you're prompted for information, such as the URL and credentials, necessary for Power BI Desktop to connect to the data source on your behalf.

After you connect to one or more data sources, you may want to transform the data so it's useful for you

## Transform and clean data, create a model

To start Power Query Editor:

* On the **Home** ribbon, in the **Queries** section, select **Transform data**.

Each step you take in transforming data (such as renaming a table, transforming a data type, or deleting a column) is recorded by Power Query Editor. Every time this query connects to the data source, those steps are carried out so that the data is always shaped the way you specify.

## Create visuals

After you have a data model, you can drag *fields* onto the report canvas to create *visuals*. A visual is a graphic representation of the data in your model. There are many different types of visuals to choose from in Power BI Desktop.

To create or change a visual:

* From the **Visualizations** pane, select the **Build visual** icon.
* If you already have a visual selected on the report canvas, the selected visual changes to the type you selected.
* If no visual is selected on the canvas, a new visual is created based on your selection.

## Create reports

More often, you'll want to create a collection of visuals that show various aspects of the data you've used to create your model in Power BI Desktop. A collection of visuals, in one Power BI Desktop file, is called a *report*. A report can have one or more pages, just like an Excel file can have one or more worksheets.

With Power BI Desktop you can create complex and visually rich reports, using data from multiple sources, all in one report that you can share with others in your organization.

## Share reports

After a report is ready to share with others, you can *publish* the report to the Power BI service, and make it available to anyone in your organization who has a Power BI license.

To publish a Power BI Desktop report:

1. Select **Publish** from the **Home** ribbon.
2. Power BI Desktop connects you to the Power BI service with your Power BI account.
3. You're prompted to select where in the Power BI service you'd like to share the report. For example, your workspace, a team workspace, or some other location in the Power BI service.

You must have a Power BI license to share reports to the Power BI service.

**Power BI Service**

Power BI is a collection of software services, apps, and connectors that work together to help you create, share, and consume business insights in the way that serves you and your business most effectively. The Microsoft Power BI service (https://app.powerbi.com), sometimes referred to as Power BI online, is the software as a service (SaaS) part of Power BI. In the Power BI service, *dashboards* help you keep a finger on the pulse of your business. Dashboards display *tiles*, which you can select to open *reports* for exploring further. Dashboards and reports connect to *datasets* that bring all of the relevant data together in one place.

## Creating reports in the service

In a typical Power BI workflow, you begin by building a report in Power BI Desktop, then publishing it to the Power BI service.

This workflow is common, but you can also create Power BI reports right in the Power BI service. Power BI has apps that automatically create dashboards and reports from your online data.

## Sharing your findings

After you've created reports and dashboards, you can share them. End users in the Power BI service and mobile devices can view and interact with them. Being able to control how you share your work is one of the most important features of the Power BI service. You create workspaces where you and your colleagues can collaborate on reports and dashboards. Then you can bundle and distribute them as apps. You can also share the datasets themselves, so others can use them as a basis for their own reports.

**Power BI Mobile**

Power BI Mobile Apps are an excellent choice for your business or management team if you need to view data on the go.

The data visualisations created and used in Power BI transform seemingly unrelated pieces of data into coherent, interactive and visually stimulating dashboards and reports. The data could be from an excel sheet, cloud technology or onsite data warehouses.

The purpose of Power BI Mobile Apps is to connect the user with their data sources, visualise the information and make the relevant decisions necessary to the future of the business. The resulting data presentation can then be shared with anyone and everyone the user wants.

Power BI mobile apps are software programmes that are designed to allow mobile users to access and interact with their business data. It combines both onsite and on cloud data to help the user view shared[dashboards in Power BI](https://www.theexcelexperts.com/dashboards-in-power-bi/) and reports through the Power BI operating system.

The Power BI Report Server manages reports and key performing through a web portal. The portal allows users to create different types of reports, including mobile reports, paginated reports and KPI’s. Microsoft Intune, however, focuses on mobile applications with an emphasis on device management and data encryption.

Here are three great reasons you should consider using[Power BI for Business](https://www.theexcelexperts.com/power-bi-business-uses-benefits-pricing/) and Power BI Apps.

1) They allow users to accumulate the content in one place. This means that the user doesn’t have to remember all of the different names of the reports, and they are all easily accessed from browsers and mobile devices.

2) The author of the reports/dashboards can schedule how often they want the data to be refreshed. The users will get notifications when the author makes any changes.

3) Power BI’s allow the author to set their own restrictions and permissions for specific parts or even the whole report. This means that the users can then only access what the author wants them to see.

**Power BI Embedded**

Power BI embedded analytics allows you to embed your Power BI items such as reports, dashboards and tiles, in a web application or in a website. You can:

* Deliver compelling data experiences for your end users, enabling them to take action based on insights from your solutions data.
* Quickly and easily provide exceptional customer-facing reports, dashboards, and analytics in your own apps by using and branding Power BI as your own.

## Secure embed

[Secure embed](https://learn.microsoft.com/en-us/power-bi/collaborate-share/service-embed-secure) is the simplest no-code way to embed a report into any portal that accepts a URL or iFrame. The viewer of the report must have the proper Power BI license. The viewer can interact with the report, but not edit, save, or make any changes to it. Secure embed is available in the Power BI service.

## What are the Power BI embedded analytics solutions?

Power BI embedded analytics gives you additional benefits over secure embed. It offers a rich, fully integrated experience with full API support, automatic authentication, and the reports can be hosted in apps as well as web pages. Embedded analytics allows you to automate the monitoring, management, and deployment of analytics, while getting full control of Power BI features and intelligent analytics.

Power BI Embedded has basically the [same features as Power BI Premium](https://learn.microsoft.com/en-us/power-bi/enterprise/service-premium-features).

Power BI embedded analytics offers two solutions:

* [Embed for your customers](https://learn.microsoft.com/en-us/power-bi/developer/embedded/embedded-analytics-power-bi#embed-for-your-customers)
* [Embed for your organization](https://learn.microsoft.com/en-us/power-bi/developer/embedded/embedded-analytics-power-bi#embed-for-your-organization)

### Embed for your customers

The *embed for your customers* solution allows you to build an app that uses non-interactive authentication against Power BI. Your customers are likely to be external users, and they don't need to sign in using Power BI credentials to view the embedded content. Typically, this solution is used by independent software vendors (ISVs) who are developing applications for third parties. For a tutorial, see [Embed Power BI content using a sample embed for your customers application](https://learn.microsoft.com/en-us/power-bi/developer/embedded/embed-customer-app).

### Embed for your organization

The *embed for your organization* solution allows you to build an app that requires signing in using Power BI credentials. Once signed in users can only consume embedded content, they have access to on Power BI service. This solution is aimed at large organizations that are building an app for internal users. For a tutorial, see [Embed Power BI content into an application for your organization](https://learn.microsoft.com/en-us/power-bi/developer/embedded/embed-organization-app).

**Power BI Report Server**

Power BI Report Server is an on-premises report server with a web portal in which you display and manage reports and KPIs. Along with it come the tools to create Power BI reports, paginated reports, mobile reports, and KPIs. Your users can access those reports in different ways: viewing them in a web browser or mobile device, or as an email in their in-box.

## Licensing Power BI Report Server

Power BI Report Server is available through two different licenses: [Power BI Premium](https://learn.microsoft.com/en-us/power-bi/enterprise/service-premium-what-is) and SQL Server Enterprise Edition with Software Assurance. See [Microsoft Volume Licensing](https://www.microsoftvolumelicensing.com/DocumentSearch.aspx?Mode=3&DocumentTypeId=1&ShowArchived=True) for details. With a Power BI Premium license, you can create a hybrid deployment mixing cloud and on-premises.

If you publish Power BI reports to Power BI Report Server, you also need a Power BI Pro license. You don't need a Power BI Pro license to view and interact with Power BI reports on Power BI Report Server.

## Web portal

The entry point for Power BI Report Server is a secure web portal you can view in any modern browser. Here, you access all your reports and KPIs. The content on the web portal is organized in a traditional folder hierarchy. In your folders, content is grouped by type: Power BI reports, mobile reports, paginated reports, KPIs, and Excel workbooks. Shared datasets and shared data sources are in their own folders, to use as building blocks for your reports. You tag favorites to view them in a single folder. And you create KPIs right in the web portal.

Depending on your permissions, you can manage the content in the web portal. You can schedule report processing, access reports on demand, and subscribe to published reports. You can also apply your own custom [branding](https://learn.microsoft.com/en-us/sql/reporting-services/branding-the-web-portal) to your web portal.

## Power BI reports

You create Power BI reports (.pbix) with the version of Power BI Desktop optimized for the report server. Then you publish them and view them in the web portal in your own environment.

A Power BI report is a multi-perspective view into a data model, with visualizations that represent different findings and insights from that data model. A report can have a single visualization or pages full of visualizations. Depending on your role, you may read and explore reports, or you may create them for others.

## Paginated reports

Paginated reports (.rdl) are document-style reports with visualizations, in which tables expand horizontally and vertically to display all their data, continuing from page to page as needed. They're great for generating fixed-layout, pixel-perfect documents optimized for printing, such as PDF and Word files.

## Reporting Services mobile reports (deprecated)

Mobile reports connect to on-premises data and have a responsive layout that adapts to different devices and the different ways you hold them. You create them with SQL Server Mobile Report Publisher.

## Report Server programming features

Take advantage of Power BI Report Server programming features to extend and customize your reports, with APIs to integrate or extend data and report processing in custom applications.

1. What limitations of Excel, Microsoft solved by PowerBi?

**Ans:** Excel is used to organize data, transform it and perform mathematical operations and calculations. On the other hand, Power BI was conceived as a business intelligence and [data visualization](https://blog.bismart.com/en/data-visualization-with-power-bi) tool for businesses.

* Excel has limitations in the amount of data it can work with. In contrast, Power BI can handle much larger amounts of data.
* Power BI can connect to a large number of data sources, while Excel's connectivity capacity is limited. Also, unlike Excel, Power BI can be easily used from mobile devices.
* Power BI has faster processing than Excel.
* Power BI dashboards are [more visually appealing, interactive and customizable](https://blog.bismart.com/en/reporting-services-and-highly-visual-and-interactive-reports) than those in Excel.
* Power BI is a more powerful tool than Excel in terms of comparison between tables, reports or data files.
* Power BI is more user friendly and easy to use than Excel.

Microsoft Excel is mainly used for simple analysis tasks on historical data only while Power BI deals with the simplification of real-time data obtained from disparate sources, apart from complex analysis of historical data

1. Explain PowerQuery?

**Ans:** Power Query is a data transformation and data preparation engine. Power Query comes with a graphical interface for getting data from sources and a Power Query Editor for applying transformations. Because the engine is available in many products and services, the destination where the data will be stored depends on where Power Query was used. Using Power Query, you can perform the extract, transform, and load (ETL) processing of data.

## **How Power Query helps with data acquisition**

Business users spend up to 80 percent of their time on data preparation, which delays the work of analysis and decision-making. Several challenges contribute to this situation, and Power Query helps address many of them.

| **Existing challenge** | **How does Power Query help?** |
| --- | --- |
| Finding and connecting to data is too difficult | Power Query enables connectivity to a wide range of data sources, including data of all sizes and shapes. |
| Experiences for data connectivity are too fragmented | Consistency of experience, and parity of query capabilities over all data sources. |
| Data often needs to be reshaped before consumption | Highly interactive and intuitive experience for rapidly and iteratively building queries over any data source, of any size. |
| Any shaping is one-off and not repeatable | When using Power Query to access and transform data, you define a repeatable process (query) that can be easily refreshed in the future to get up-to-date data. In the event that you need to modify the process or query to account for underlying data or schema changes, you can use the same interactive and intuitive experience you used when you initially defined the query. |
| Volume (data sizes), velocity (rate of change), and variety (breadth of data sources and data shapes) | Power Query offers the ability to work against a subset of the entire dataset to define the required data transformations, allowing you to easily filter down and transform your data to a manageable size. Power Query queries can be refreshed manually or by taking advantage of scheduled refresh capabilities in specific products (such as Power BI) or even programmatically (by using the Excel object model). Because Power Query provides connectivity to hundreds of data sources and over 350 different types of data transformations for each of these sources, you can work with data from any source and in any shape. |

## **Power Query experiences**

The Power Query user experience is provided through the Power Query Editor user interface. The goal of this interface is to help you apply the transformations you need simply by interacting with a user-friendly set of ribbons, menus, buttons, and other interactive components.

The Power Query Editor is the primary data preparation experience, where you can connect to a wide range of data sources and apply hundreds of different data transformations by previewing data and selecting transformations from the UI. These data transformation capabilities are common across all data sources, whatever the underlying data source limitations.

When you create a new transformation step by interacting with the components of the Power Query interface, Power Query automatically creates the M code required to do the transformation so you don't need to write any code.

Currently, two Power Query experiences are available:

* **Power Query Online**—Found in integrations such as Power BI dataflows, Microsoft Power Platform dataflows, Azure Data Factory wrangling dataflows, and many more that provide the experience through an online webpage.
* **Power Query for Desktop**—Found in integrations such as Power Query for Excel and Power BI Desktop.

 Note

Although two Power Query experiences exist, they both provide almost the same user experience in every scenario.

## **Transformations**

The transformation engine in Power Query includes many prebuilt transformation functions that can be used through the graphical interface of the Power Query Editor. These transformations can be as simple as removing a column or filtering rows, or as common as using the first row as a table header. There are also advanced transformation options such as merge, append, group by, pivot, and unpivot.

All these transformations are made possible by choosing the transformation option in the menu, and then applying the options required for that transformation. The following illustration shows a few of the transformations available in Power Query Editor.

Power Query can be used in many products, such as Power BI and Excel. However, using Power Query within a product limits its usage to only that specific product. *Dataflows* are a product-agnostic service version of the Power Query experience that runs in the cloud. Using dataflows, you can get data and transform data in the same way, but instead of sending the output to Power BI or Excel, you can store the output in other storage options such as Dataverse or Azure Data Lake Storage. This way, you can use the output of dataflows in other products and services.

## **Where can you use Power Query?**

The following table lists Microsoft products and services where Power Query can be found.

| **Product** | **M engine1** | **Power Query Desktop2** | **Power Query Online3** | **Dataflows4** |
| --- | --- | --- | --- | --- |
| Excel for Windows | Yes | Yes | No | No |
| Excel for Mac | Yes | Yes | No | No |
| Power BI | Yes | Yes | Yes | Yes |
| Power Apps | Yes | No | Yes | Yes |
| Power Automate | Yes | No | Yes | No |
| Power BI Report Server | Yes | Yes | No | No |
| Azure Data Factory | Yes | No | Yes | Yes |
| SQL Server Integration Services | Yes | No | No | No |
| SQL Server Analysis Services | Yes | Yes | No | No |
| Dynamics 365 Customer Insights | Yes | No | Yes | Yes |

1. Explain PowerMap?

**Ans:** A power map lets you discover insights you might not see in traditional two-dimensional (2-D) tables and charts. With Power Map, you can plot geographic and temporal data on a 3-D globe or custom map, show it over time, and create visual tours that we can share with other people.

There are 4 types of core or built-in map visuals:

* Map (Basic)
* Filled Map
* ArcGIS Maps
* Shape Map

## Power BI (Basic) Map:

This type of map is best for basic display. There’s not much customization you can do as this is only good for common uses. However, there are certain things you can do to make it look better and fit your purposes like changing the map style and turning it into a heat map.

Pros:

* Easy to use
* Fully supported by the Microsoft Power BI team
* Perfect for basic and common uses
* Includes map themes

Cons:

* Rare geocoding issues giving you inaccurate locations
* No support for custom geographic formats like GeoJson, ESRI Shapefiles, and others

## Filled Map:

A filled map, also known as a choropleth map, shows shaded geographic areas. You might find it a bit similar to the heat map. However, a filled map displays different values on the map by color scaling and saturation.

Pros:

* Easy to use
* Also has map styles available
* Flexible map

Cons:

* Rare geocoding issues giving you inaccurate locations
* No support for custom geographic formats like GeoJson, ESRI Shapefiles, and others

## ArcGIS Maps for Power BI:

ArcGIS (Geographic Information Systems) maps are more advanced than your typical basic map. This type of map includes features not found in others like drivetime radius and clustering.

Pros:

* Options for drivetime and distance radii
* Clustering feature as you zoom in or out
* Heatmap feature
* Option for reference layers from ArcGIS Online
* Built-in infographics feature that updates as you move around the map

Cons:

* Can’t add custom shapes unless added to ArcGIS Online first and shared publicly
* Not shown when publishing to web or embedding
* Not available for Power BI Report Server

## Shape Map:

This is a type of map that shows polygon shapes on the canvas with a blank background. A shape map varies with the other maps in a lot of ways including having built-in geographies and the ability to import custom shapes using the TopoJSON format.

Pros:

* Allows custom geography
* Allows any type of 2D shape

Cons:

* Still in preview mode so it can only be used in Power BI Desktop
* No background or basemap option
* No label on the map
* No points or lines; only renders polygon shapes
* Not ideal for large TopoJSON file as it may load slowly

1. How powerBi eliminated the need to host SharePoint Server on premises?

**Ans:** Power BI has become the most widely used tool for reporting due its user-friendly interface which allows business users to generate sleek and customizable reports and interact quickly and easily with their data using simple drag-and-drop features and a plethora of customizable visualizations.  Power BI Service further extended the capabilities by providing a robust report hosting cloud-based SaaS platform through which reports can be easily shared with colleagues for collaboration and made more accessible. However, if your organization has an on-premises setup and doesn’t want to set up a Gateway to expose the reports to the cloud then Power BI Service cant be used for hosting reports and an OnPremises hosting server would be required. In order to provide similar functionality to the on-premises users, Microsoft has introduced Power BI Report Server which uses SQL Server Reporting Services technology for hosting reports On-Premises. In this blog, we will take a deeper look at the Power BI report server, its features, and functionality, and how it is compared with Power Bi Service.

## **Power BI: A reporting tool like no other**

Microsoft Power BI is a desktop-based reporting tool that enables you to collect, filter, combine, analyze and visualize and finally publish your data in form of a report or a collection of reports called Dashboard. Power BI provides a simple and user-friendly interface that can be used by business and power-users easily. Also, it allows for collecting data from a wide range of data sources. If you’re a business or power user who wants to work robustly on the data of your organization, then you will be using Power BI Desktop which is free to download.

## **Power BI Report Server: An On-premises Power BI Service alternative**

Power BI Report Server is an on-premises report distribution technology offered by *Microsoft Power BI***Deployment Suit** that is primarily used for hosting and sharing Power BI reports. Since it should be hosted on the machine in the company’s domain, it’s not an online service and therefore allows organizations to host and share reports OnPremises. It comes with a web portal which is an entry point to access Power BI reports and provides additional tools to create and host Power BI reports paginated reports, mobile reports, and KPIs. It consists of a web portal that provides features to view Power BI reports, paginated reports, Excel files, and KPIs, and navigate through the elements in your report server instance. You can also use the web portal to administer a single report server instance.

1. Explain the updates done in Power Bi Service(power BI 2.0) as compared to older version ?

**Ans:** The following updates are new to the Power BI service this month:

* New features to Deployment Pipeline
* Storytelling in PowerPoint - new style option
* Visualizing views in Power Apps with Power BI quick report enabled by default