



# MICROSOFT POWER BI

Project Report

TEPM 6301 – Project Management Principles

## ABSTRACT

A project report on MS Power BI that gives an insight on preparing smart reports and dashboards for your project.

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## **Business Intelligence & Power BI**

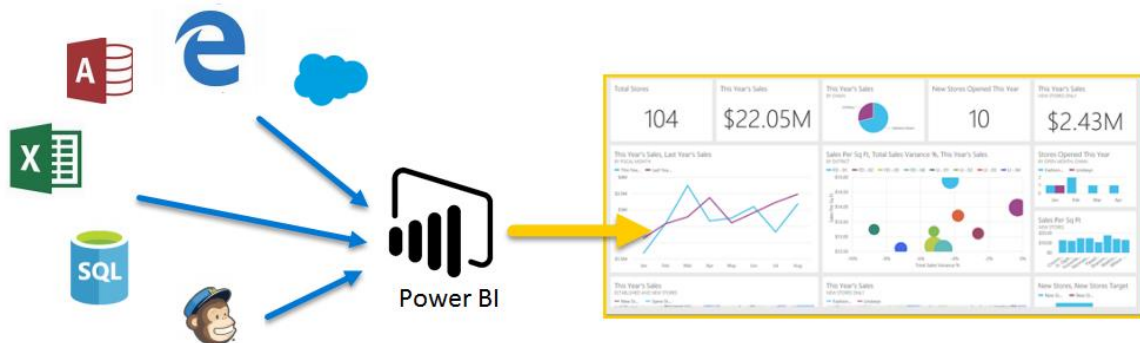
**Business intelligence (BI)** is a set of methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information used to enable more effective strategic, tactical, and operational insights and decision-making. BI encompasses a wide variety of tools, applications and methodologies that enable organizations to collect data from internal systems and external sources; prepare it for analysis; develop and run queries against that data; and create reports, dashboards and data visualizations to make the analytical results available to corporate decision-makers, as well as operational workers.

I feel it is important to learn on trending business intelligence as it is being a useful aspect in project management. BI tools being combination of machine learning, data analytics and predictive intelligence helps in presenting project in a more user-friendly way. Project reports and dashboards are now no-big deal. With this project, I am introducing a powerful BI tool of Microsoft called "**Power BI**". Power BI is business analytics service that can empower everyone – not just data specialists – with real time insight to what is happening. Power BI lets you access real-time information to identify trends early. That way, you can head off potential issues and improve performance sooner rather than later. With advanced analytics integration through R scripts and visuals, Microsoft Azure Machine Learning, and Azure Stream Analytics, it uses data to predict outcomes for business. Predictive intelligence can help in taking proactive action to stay on the right path to achieve goals. Power BI Q&A allows to ask questions and get super-fast answers in the form of charts and graphs ready for pinning to dashboards. Through deep integration with Windows 10, Cortana makes BI as easy as search, right on desktop. Power BI is not limited to "what's in the box". With Custom visuals, Power BI allows to have any visualization we can imagine. Since the beginning, Power BI has been engineered so that it can be easily used with Excel, Office 365, Azure, SQL Server and many other data sources. Whether your data lives in a cloud service or on-premises, Power BI enables you to connect, clean, shape, model, and visualize it with live reports and dashboards.

## **Microsoft Power BI**

**Microsoft Power BI** is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Whether your data, a simple Microsoft Excel workbook, or a collection of cloud-based and on-premises hybrid data warehouses, Power BI lets you easily connect to your data sources, visualize (or discover) what's important, and share that with anyone or everyone you want. Power BI is an application that lets you connect to, transform, and visualize your data. This is a powerful tool, with a lot of features that helps you stay up to date with the information that matters to you. Connecting to multiple datasets from Power BI helps you bring all your relevant data together in one place. Power BI suite provides multiple software, connector, and services - Power BI desktop, Power BI service based on SaaS, and mobile Power

BI apps available for different platforms. Power BI desktop app is used to create reports, while Power BI Services (Software as a Service - SaaS) is used to publish the reports, and Power BI mobile app is used to view the reports and dashboards.

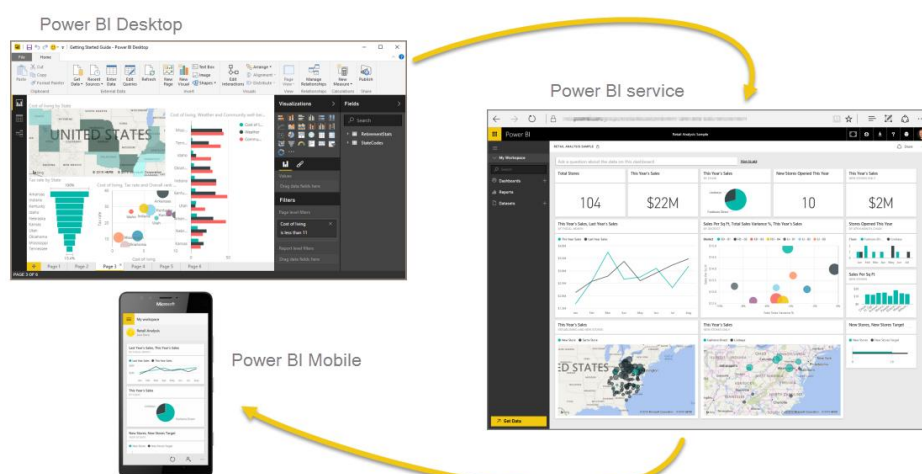


**Power BI** can be simple and fast, capable of creating quick insights from an Excel workbook or a local database. But Power BI is also robust and enterprise-grade, ready not only for extensive modelling and real-time analytics, but also for custom development. Therefore, it can be your personal report and visualization tool, but can also serve as the analytics and decision engine behind group projects, divisions, or entire corporations.

## Architecture

Power BI includes 3 main components –

1. **Power BI Desktop** – This is the Microsoft Windows desktop application used to generate and model dashboard and reports/visualizations on the dataset.
2. **Power BI Mobile Apps** – Using Power BI mobile apps, you can stay connected to their data from anywhere. Power BI apps are available for Windows, iOS, and Android platform.
3. **Power BI Service** – This is a cloud service and is used to publish Power BI reports and data visualizations.



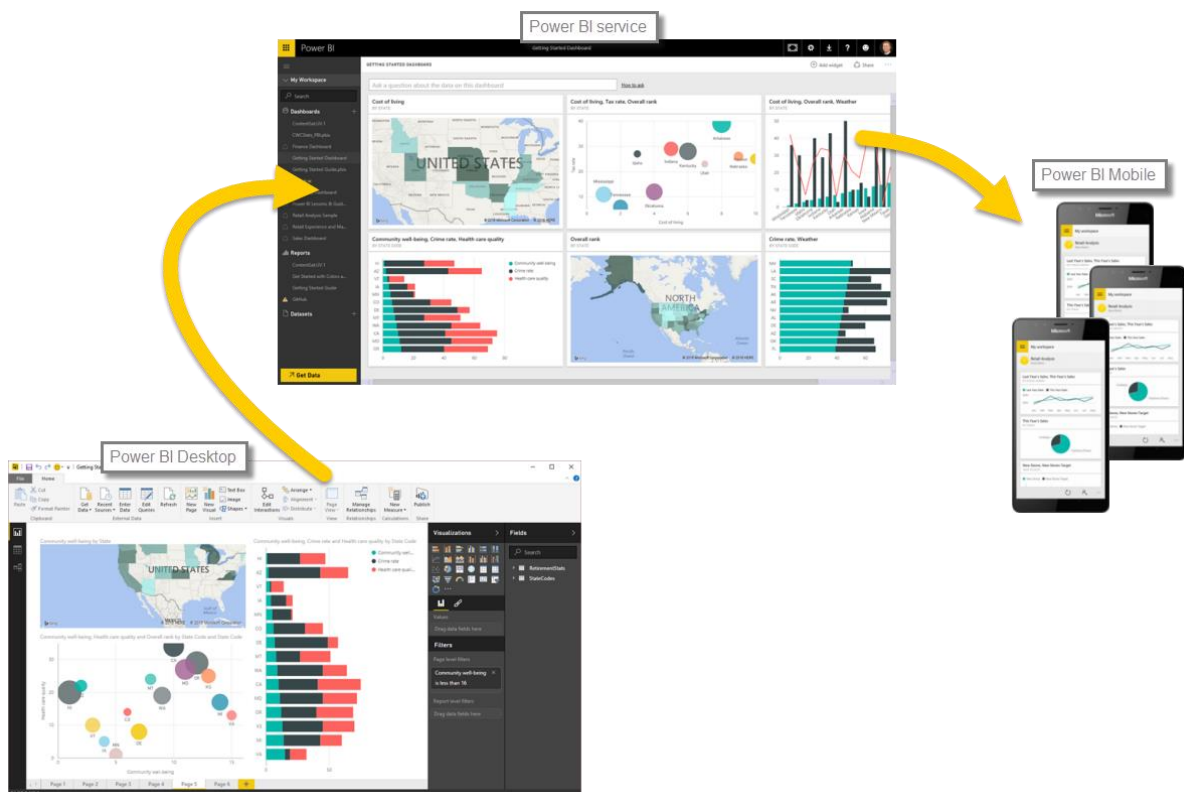
How you use Power BI might depend on your role on a project or a team. And other people, in other roles, might use Power BI differently. You could be the one who might view reports and dashboards in the Power BI Service. This could be only thing you do with power bi. Sometimes you could be the one who analyse data and prepare visualizations and dashboards which later will be published to power bi services. Or else you could be the one who monitor project progress, manage it, use it for tracking project route from personal devices such as mobile phones or laptops. You also might use each element of Power BI at different times, depending on what you're trying to achieve, or what your role is for a given project or effort.

## Usage Flow

Basically, it all begins with Power BI Desktop from where reports and dashboards are created. Then, it will be published to power bi cloud services which facilitates global access of these generated items. Finally, it will be Power BI Mobile apps that allows users to consume the information.

The **common flow** of activity in Power BI looks like this:

- Bring data into Power BI Desktop, and create a report.
- Publish to the Power BI service, where you can create new visualizations or build dashboards.
- Share dashboards with others, especially people who are on the go.
- View and interact with shared dashboards and reports in Power BI Mobile apps.

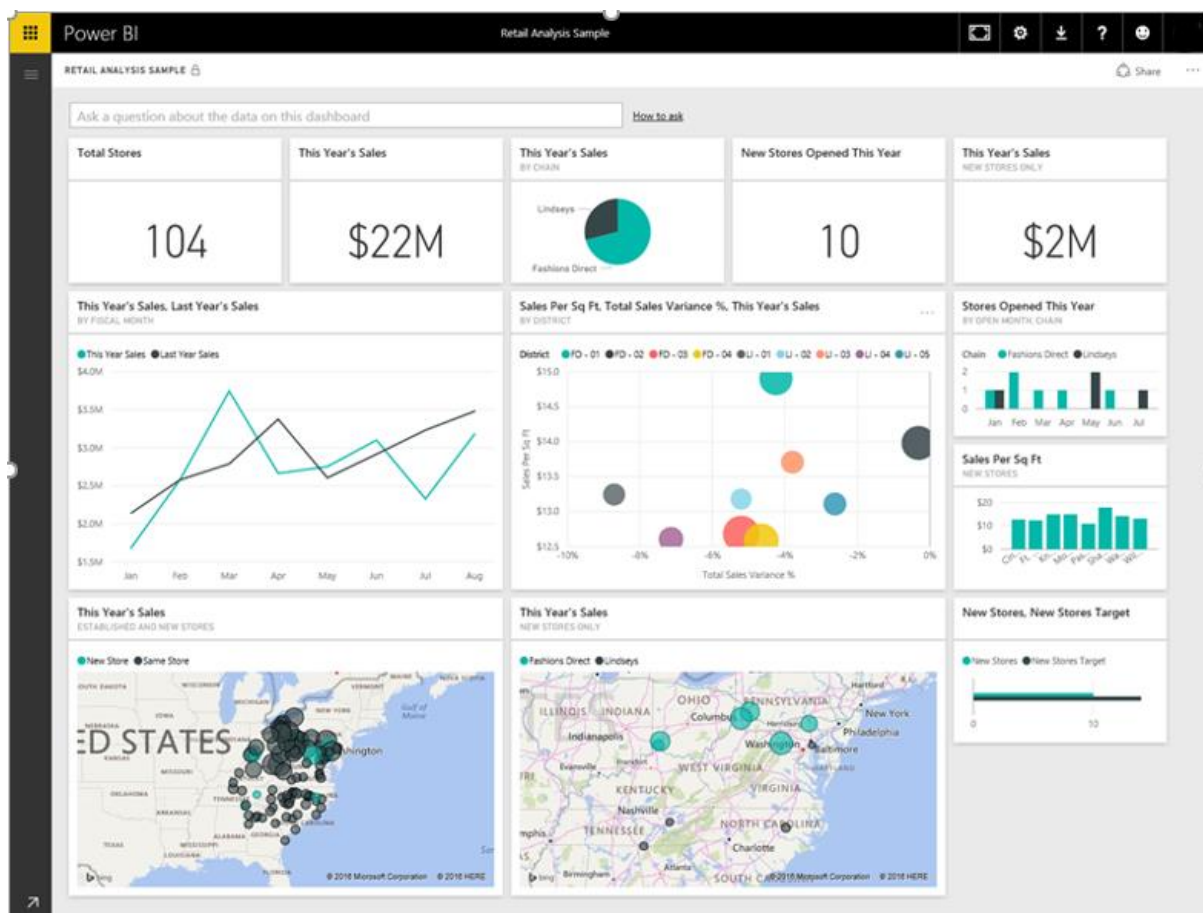


## Building blocks of Power BI

Power BI Desktop consists of 5 main items.

- Visualizations
- Datasets
- Reports
- Dashboards
- Tiles

**Visualization** is a visual representation of data like a chart, a color-coded map, or other interesting things. Power BI has all sorts of visualization types. Below image shows a collection of different visualizations that were created in the Power BI service.

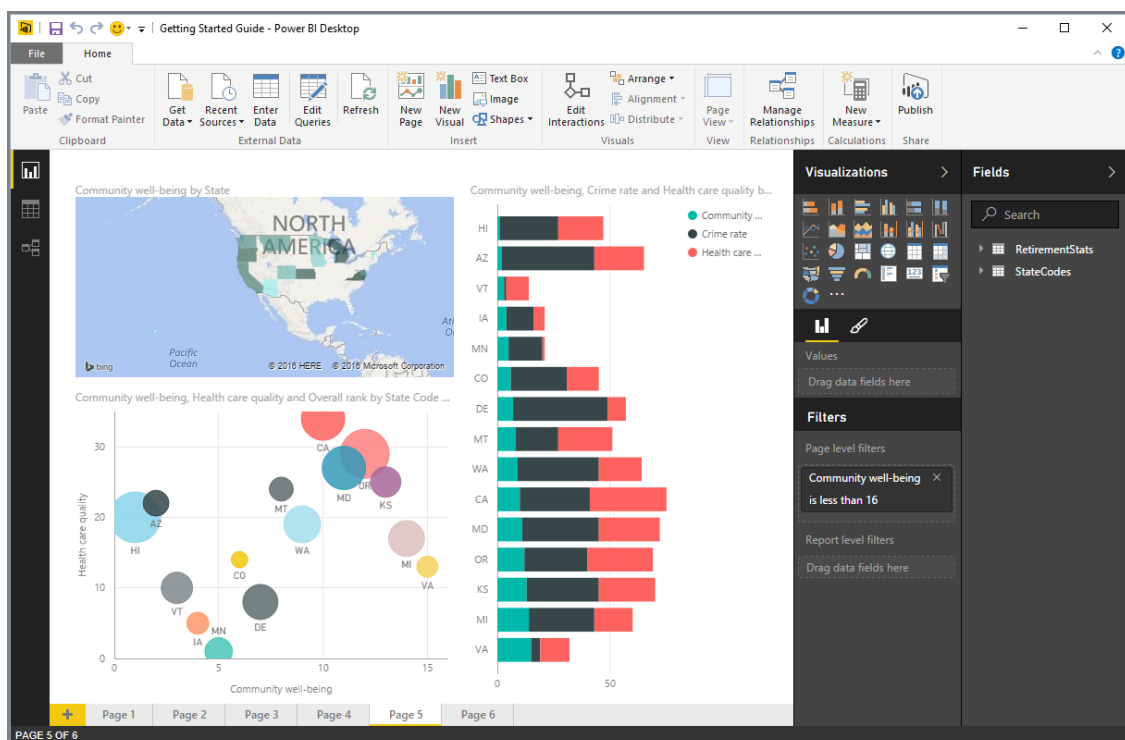


A **dataset** is a collection of data that Power BI uses to create its visualizations. It can also be a combination of many different sources, which you can filter and combine to provide a unique collection of data (a dataset) for use in Power BI. Filtering data before bringing it into Power BI lets you focus on the data that matters to you. Filtering helps you focus your data—and your efforts. An important and enabling part of Power BI is the multitude of data **connectors** that are included. Whether the data you want is in Excel or a Microsoft SQL Server database, in Azure or Oracle, or in a service like Facebook, Salesforce. Etc., Power BI has built-in data connectors that let you easily connect to that data, filter it if necessary, and bring

it into your dataset. Below diagram shows a filtered dataset used to create or parameterize visualizations in a Power BI report.

	B	C	D	E	F	G	H
1	Year	Month	Month Name	Calendar Month	Births	Births Per Day	Births (Normalized)
2119	2004	1	January	1/1/2004	2,937	94.7	2842
2120	2004	2	February	2/1/2004	2,824	97.4	2921
2121	2004	3	March	3/1/2004	3,128	100.9	3027
2122	2004	4	April	4/1/2004	2,896	96.5	2896
2123	2004	5	May	5/1/2004	3,008	97.0	2911
2124	2004	6	June	6/1/2004	3,047	101.6	3047
2125	2004	7	July	7/1/2004	2,981	96.2	2885
2126	2004	8	August	8/1/2004	3,079	99.3	2980
2127	2004	9	September	9/1/2004	3,219	107.3	3219
2128	2004	10	October	10/1/2004	3,547	114.4	3433
2129	2004	11	November	11/1/2004	3,365	112.2	3365
2130	2004	12	December	12/1/2004	3,143	101.4	3042
2131	2005	1	January	1/1/2005	2,921	94.2	2827
2132	2005	2	February	2/1/2005	2,699	96.4	2892
2133	2005	3	March	3/1/2005	3,024	97.5	2926
2134	2005	4	April	4/1/2005	3,037	101.2	3037
2135	2005	5	May	5/1/2005	3,231	104.2	3127
2136	2005	6	June	6/1/2005	3,163	105.4	3163
2137	2005	7	July	7/1/2005	3,119	100.6	3018
2138	2005	8	August	8/1/2005	3,156	101.8	3054
2139	2005	9	September	9/1/2005	3,439	114.6	3439

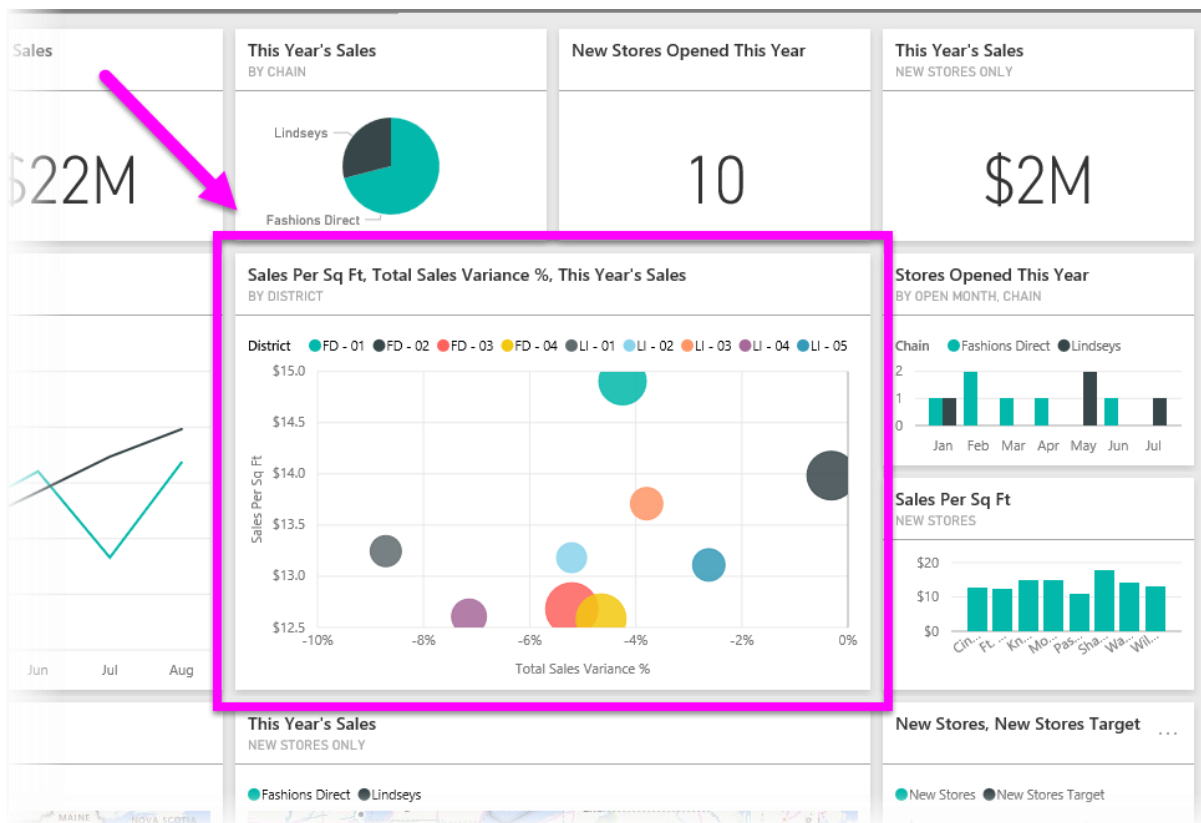
A **report** is a collection of visualizations that appear together on one or more pages. It is a collection of items that are related to each another.



Picture above shows a sample report where it comprises of 6 pages. Currently you are viewing fifth page of it. Reports lets you arrange visualizations in best way.

When you're ready to share a single page from a report, or a collection of visualizations, you create a **dashboard**. A Power BI **dashboard** is a collection of visuals from a single page that you can share with others. Often, it's a selected group of visuals that provide quick insight into the data.

A **tile** is a single visualization on a report or a dashboard. It's the rectangular box that holds an individual visual. In the below figure, highlighted portion is a tile surrounded by other tiles. Its dimensions can be adjusted as you need it to be displayed. You can even move it wherever in the report sheet or dashboard.



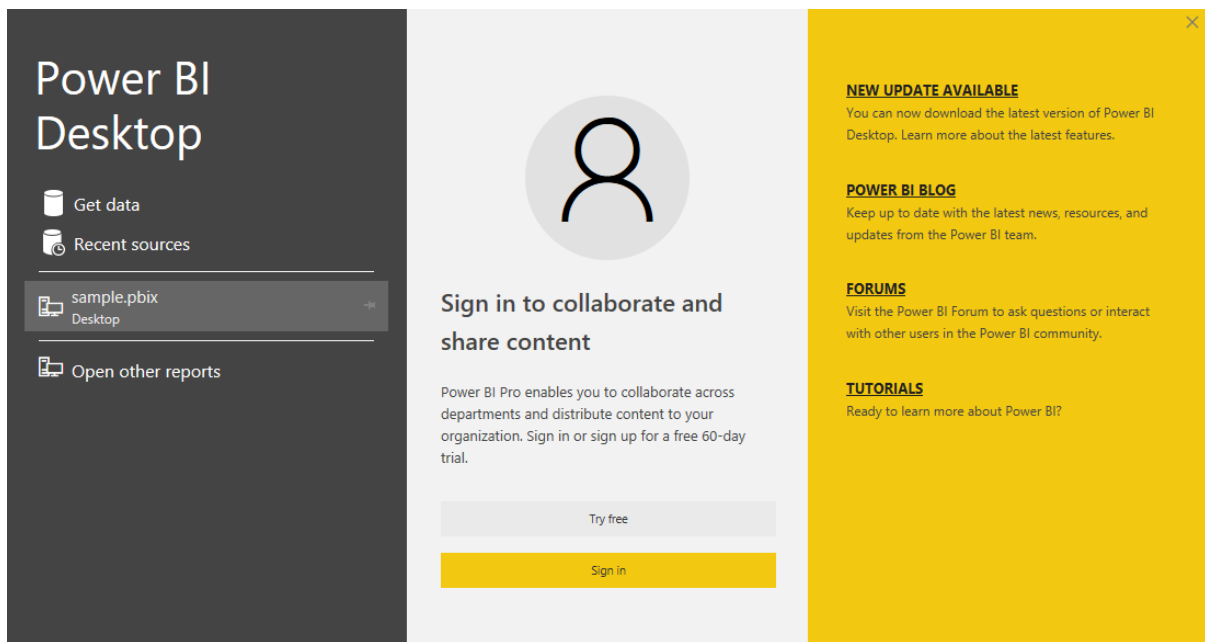
## Install & Run Power BI

Power BI Desktop is available in both 32-bit and 64-bit versions. To download the latest version, you can use the following link <https://powerbi.microsoft.com/en-us/downloads/>

You can also install **Power BI Desktop** as an app from **Microsoft Store** even. Power BI Desktop is installed as an application and runs on your desktop.

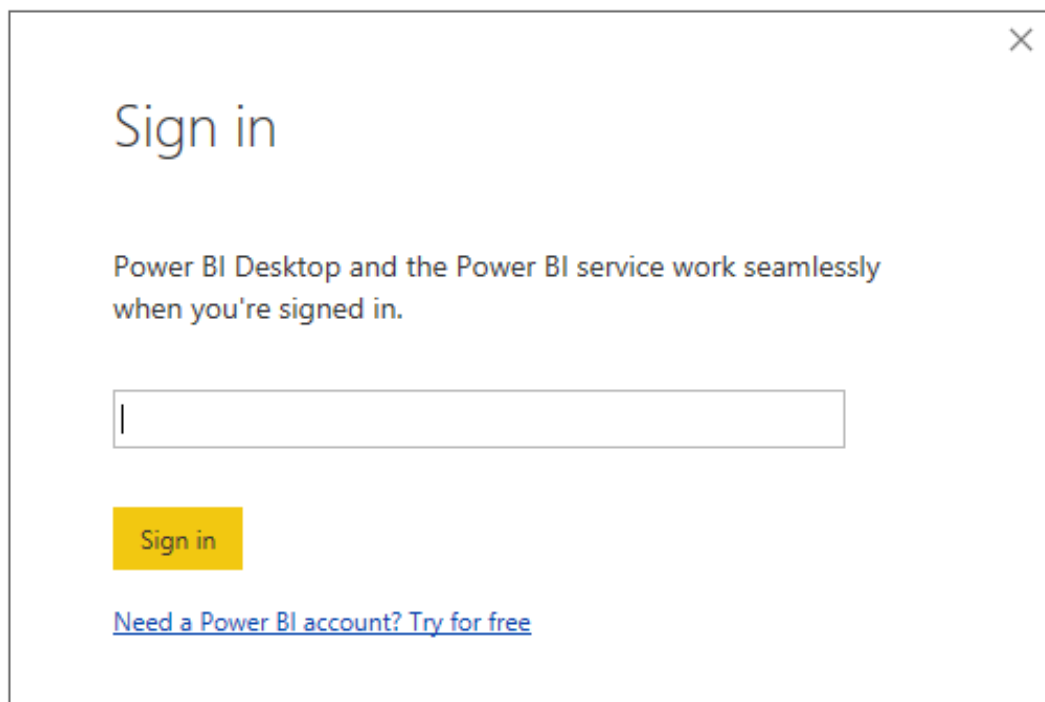
When you start Power BI Desktop, a *Welcome* screen is shown.





The left black coloured pane helps you to get data or see recent sources or even open other power bi files directly from the welcome screen. When you close this screen, a blank report view will be displayed by default.

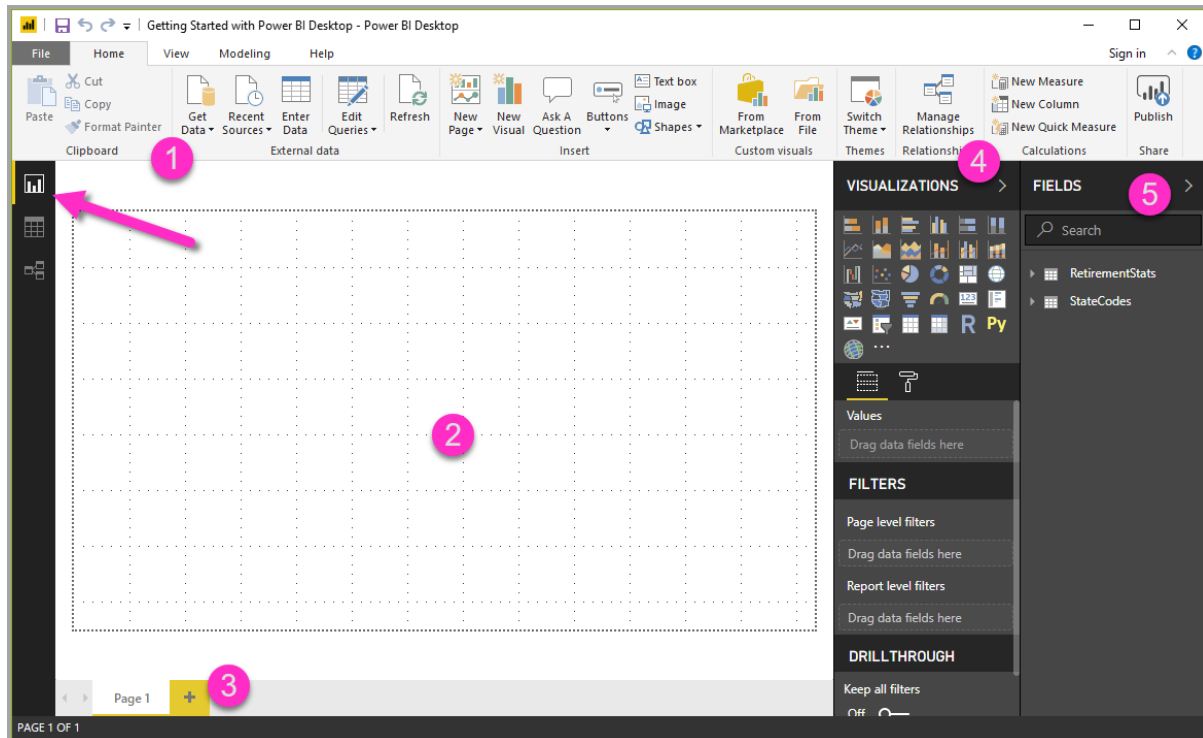
It is necessary to sign in to Microsoft Power BI account to publish your works to Power BI service. This will store your file to cloud service which makes it feasible to load into any other supported platform. Click on **Sign In** button at welcome screen. Or else you can skip it for now by clicking Try free. To sign in at later point of time, click on sign in option available at top-right corner of first Report Page that appears by default. This will pop up a sign in dialogue. Professional or academic related email IDs are only accepted for sign in/sign up in Power BI service.





## Report Page

A **Report Page** is the playground where you start building your report using visualizations or tiles based on your thought, available dataset and creativity.



This figure shows a default **Report Page**. A report page in Power BI Desktop contains mainly five pane/areas as marked in this picture above.

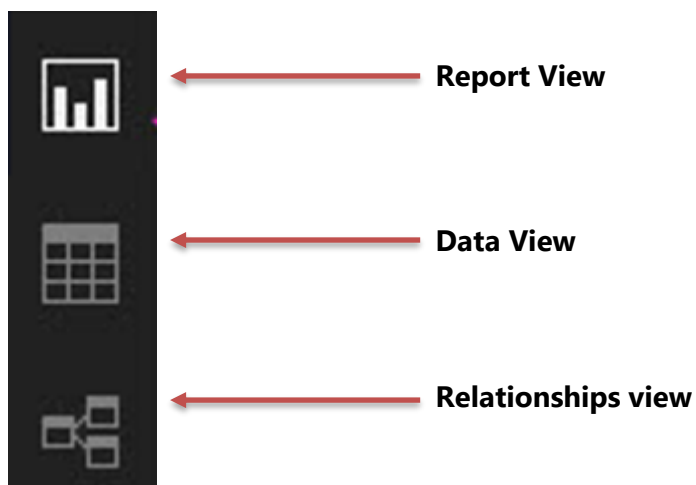
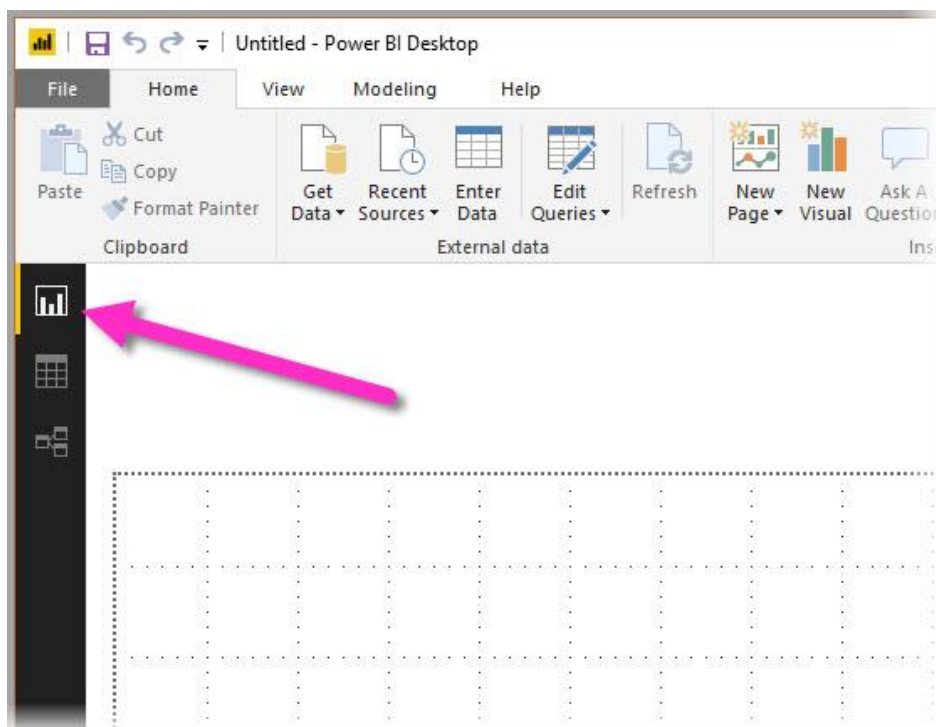
1. The **Ribbon/Task** pane, which shows common tasks associated with reports and visualizations.
2. The **Report** view, or canvas, where visualizations are created and arranged.
3. The **Pages** tab area along the bottom, which lets you select or add report pages.
4. The **Visualizations** pane, where you can change visualizations, customize colours or axes, apply filters, drag fields, and more.
5. The **Fields** pane, from which query elements and filters can be dragged either onto the Report view or into the *Filters* area of the *Visualizations* pane.

## Views in Power BI

There are three main *views* options in Power BI Desktop. They are

- **Report** view
- **Data** view
- **Relationships** view

These are available at left most black coloured pane of a report page. The *yellow line* on a view icon represents the current view. In the picture, you are currently viewing the report view, indicated by arrow.



**Report view** gives graphical representations of data. All visual items used to prepare report will be visible in this view. Bar chart, pie chart, donut chart, line chart, map etc. are examples of visual items.

**Data view** gives tabular view of data for each data set used to prepare report/dashboard. Data sorted from different sources will be displayed here.

**Relationship view** details relation or connection between different data tables used. For instance, if values of a column in a data table is used in another column of different data table, this could bring up a relationship between the tables. A relationship is identified by a line arrow flowing from one table to another.

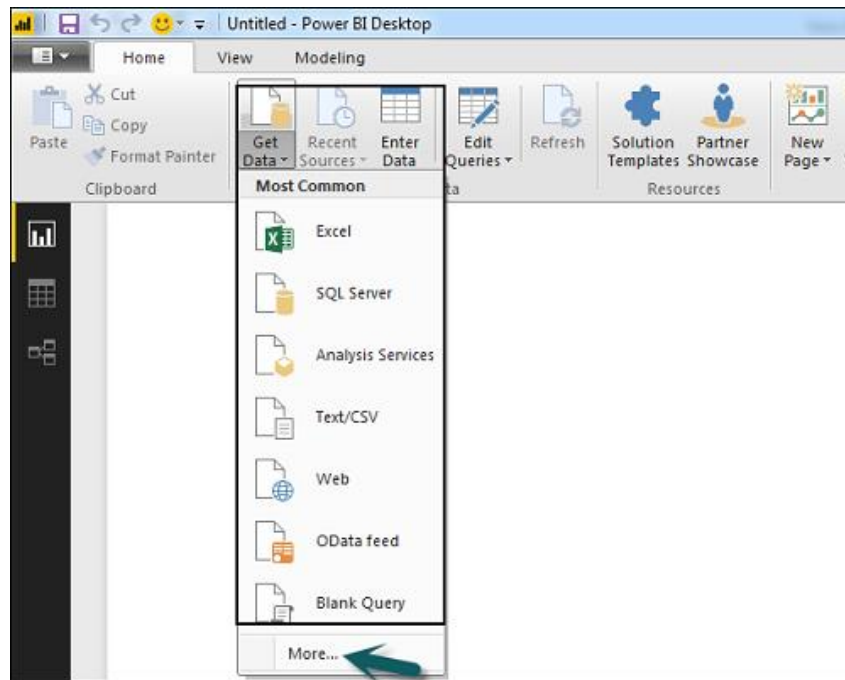
## **Data Integration**

Power BI supports large range of data sources. You can click **Get data** option in report page and it shows you all the available data connections. It allows you to connect to different flat files, SQL database, and Azure cloud or even web platforms such as Facebook, Google Analytics, and Salesforce objects.

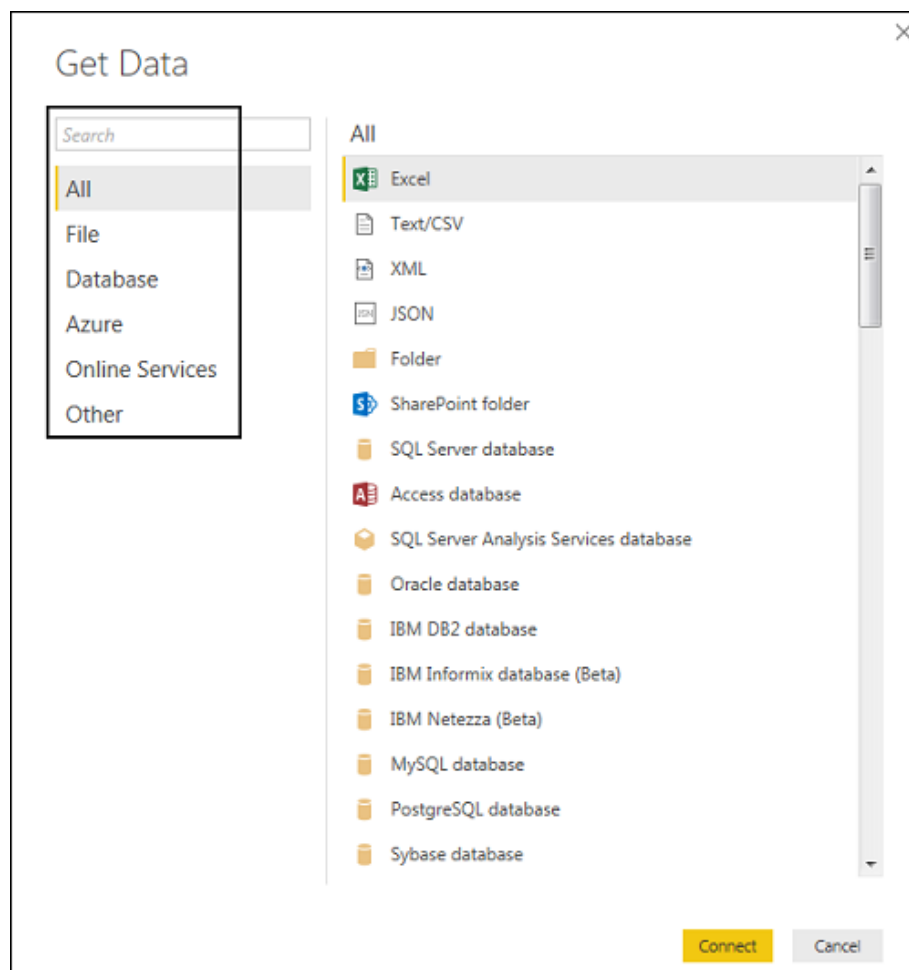
Following are the available data sources in Power BI:

- Flat Files
- SQL Database
- OData Feed
- Blank Query
- Azure Cloud platform
- Online Services
- Blank Query
- Other data sources such as Hadoop, Exchange, or Active Directory

To get data in Power BI desktop, you need to click the 'Get data' option in the main screen as mentioned above. It shows you the most common data sources first. Then, click the 'More option' to see a full list of available data sources. This is displayed in the below picture.



When you click "More.." tab as shown in the above screenshot, you can see a new navigation window, where on the left side it shows a category of all available data sources. You also have an option to perform a search at the top.



**All** – Under this category, you can see all the available data sources under Power BI desktop. This is highlighted in the above picture.

**File** – File sorts all flat file types supported in Power BI desktop. To connect to any file type, select the file type from the list and click Connect. You must provide the location of the file. File types supported by Power BI are Excel, Text/CSV, XML, JSON, Folder, and SharePoint folder.

**Database** – Database option sorts a list of all the database connections that you can connect to using Power BI. To connect to any database, select a Database type from the list and click 'Connect' option. You must pass Server name/ User name and password to connect. You can also connect via a direct SQL query using Advance options. Under this, choose a Connectivity mode, either Import or DirectQuery, that displays up.

DirectQuery option limits the option of data manipulation and the data stays in SQL database. It is live and there is no need to schedule refresh as in the Import method.

Import method allows to perform data transformation and manipulation. When you publish the data to PBI service, limit is 1GB. It consumes and pushes data into Power BI Azure backend and data can be refreshed up to 8 times a day and a schedule can be set up for data refresh.

**Azure** – Using the Azure option, you can connect to the database in Azure cloud. Various options available under Azure category include Azure SQL database, SQL Data Warehouse, blob storage, table storage etc.

**Online Services** – Power BI also allows you to connect to different online services such as Salesforce, Google Analytics, and Facebook.

**Other** – Other major data sources like Web, MS Exchange, Hadoop file, ODBC etc. falls under this category.

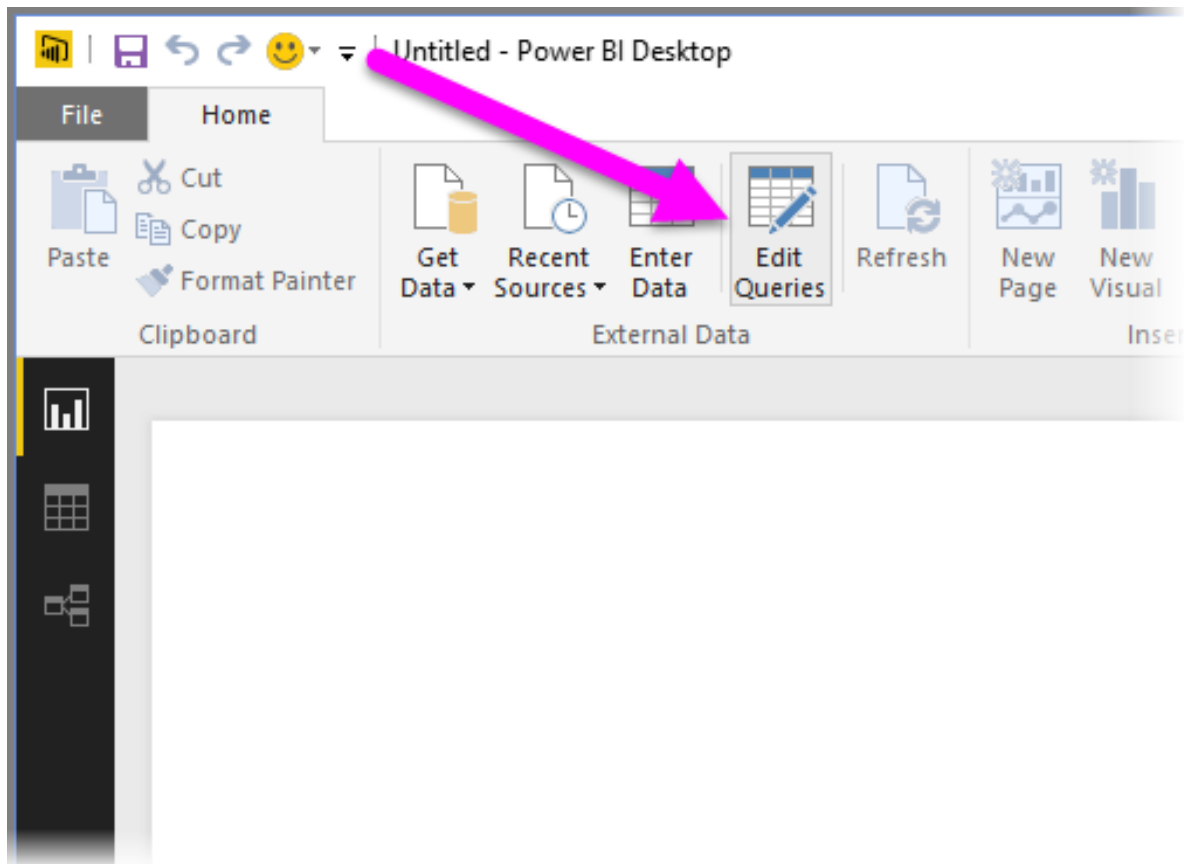
## **Query Editor**

Before you start building dashboard/reports, you need to grab data from various sources. It will be residing at different places in different formats. You need to access it, look at it, and quickly clean it up to some extent. You may also need to join separate data sources before you can shape the data into a coherent data set. Discovering, loading, cleaning, and modifying source data is where Power BI Query editor comes in. It lets you load, shape and streamline data from multiple sources.

The four main steps are:

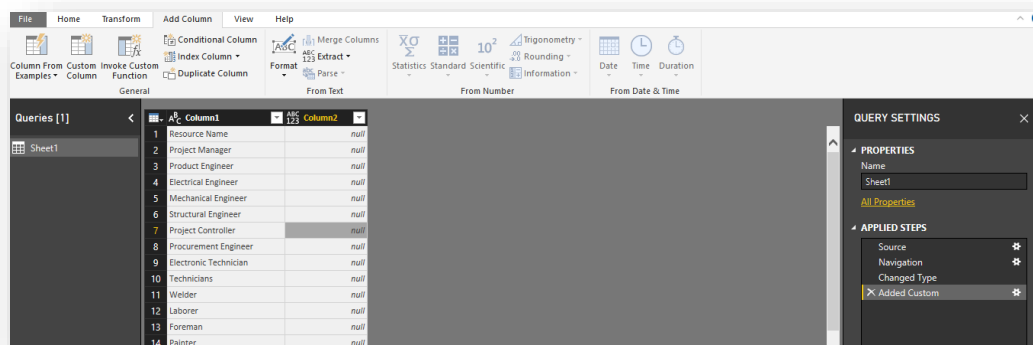
- Import data from a wide variety of sources.
- Merge data from multiple sources into a coherent structure.
- Shape data into the columns and records that suit your uses.
- Cleanse your data to make it reliable and easy to use.

You can launch **Query Editor** directly from Power BI Desktop, using the **Edit Queries** button on the Home ribbon. This is illustrated in the below picture with an arrow.

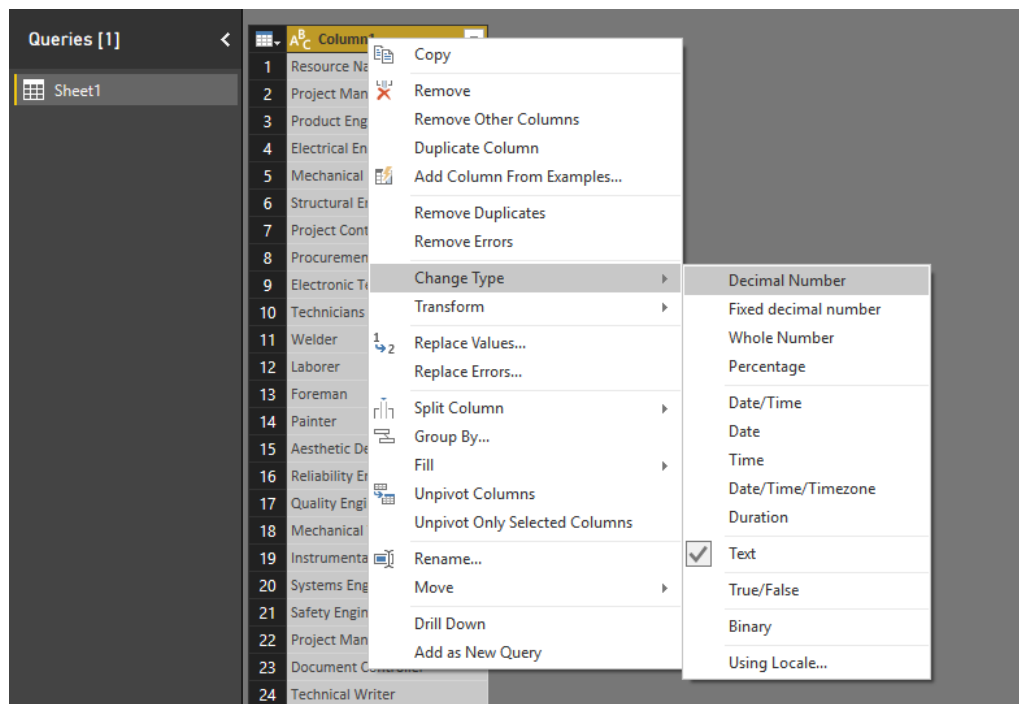


On clicking 'Edit Queries' option, a new window pops up with data that are ready for you to shape (data that was previously loaded in report page). In the left pane, **queries** (one for each table, or entity) are listed and available for selection, viewing, and shaping. Top pane of query editor provides options to interact and manipulate data.

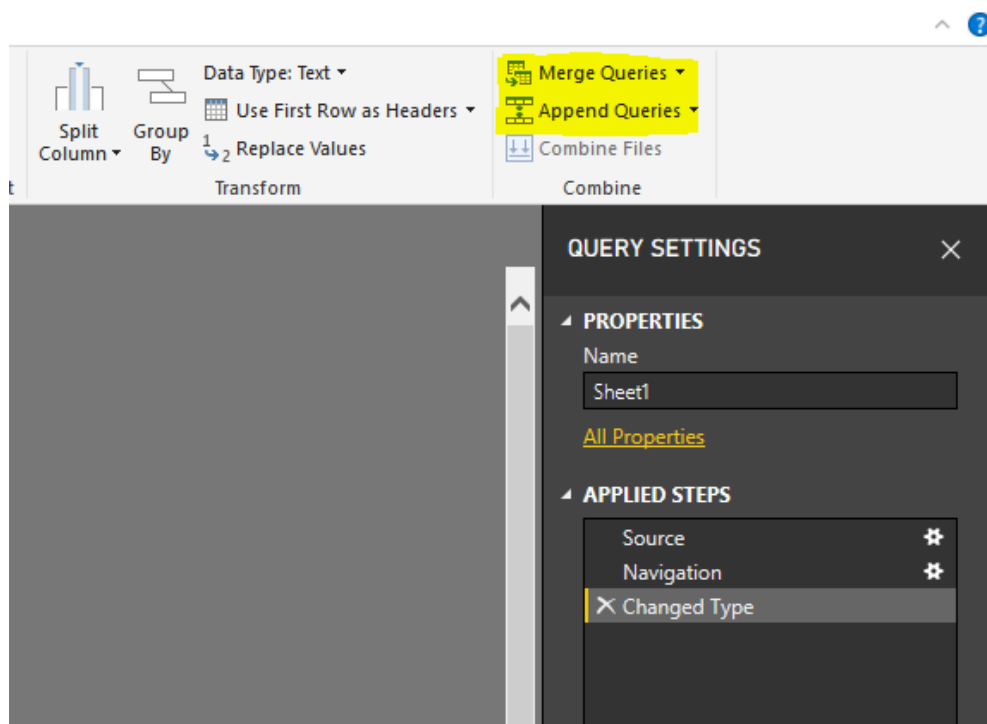
In the centre pane, data from the selected query is displayed and are available for shaping. The Query Settings pane lists the query's properties and applied steps. In the figure, a query is available for shaping with 2 columns of data. Actions applicable for these data shaping is enabled in the top pane. This query has a property "Name" with value "Sheet1" is displayed at Query Settings pane at the right. Manipulations made to data at central pane will be mentioned under "*Applied Steps*" section. One of Power BI's most useful tool is its *Filters*. For example, selecting the drop-down arrow next to a column opens a checklist of text filters that you can use to remove values from your model.



Transformation options for the data can be viewed by right clicking on column header as shown in picture. Major transformations include removing, duplicating, adding, changing type of columns. From this menu you can also split text columns into multiples by common delimiters like space, comma, hyphen etc.

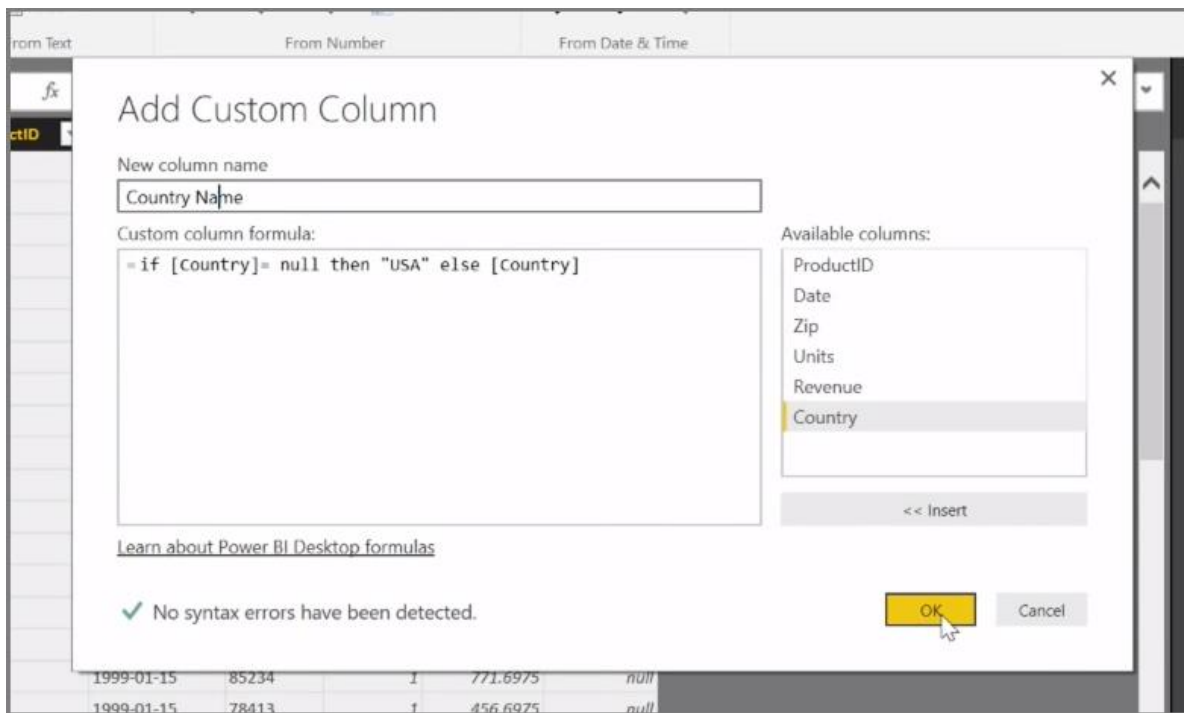


There are options to merge and append queries in query editor that enable data from different sources to bring under one table. These are highlighted in the picture. This will facilitate adding only necessary data to an existing query. Power BI Desktop attempt to match up the columns in your queries, which you can then adjust as necessary in Query Editor.





Users can add custom column to queries. Add **Custom Column** tool gives advanced users the option of writing query expressions from scratch using the powerful M language. You can add a custom column based on M query language statements and get your data just the way you want it. An example is shown here to add a custom column "Country Name". The column formula used will put value to column based on existing column "Country" in the query. If any data cell under "Country" column is null, then value to this custom column will be "USA" instead of null.

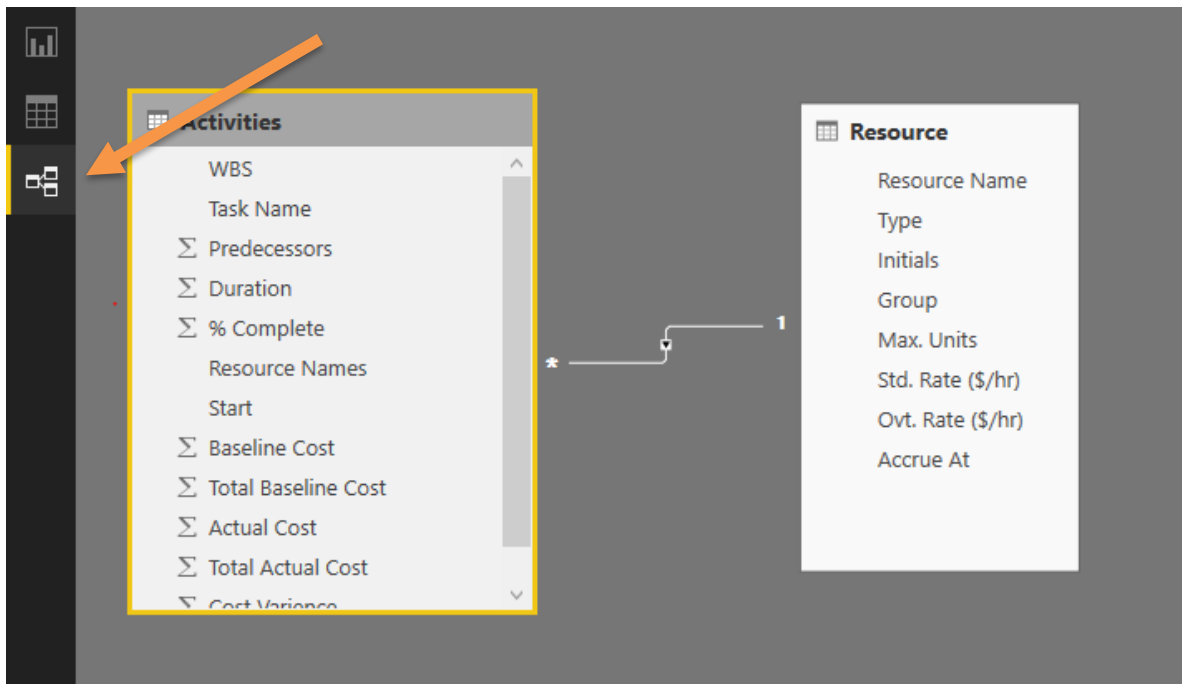


As you apply transformations, each step appears in the **Applied Steps** list in the Query Settings pane on the right side of Query Editor. You can use this list to undo or review specific changes, or even change the name of a step. To save your transformations, select **Close & Apply** on the **Home** tab. Once you select "Close & Apply", Query Editor applies the query changes you made, and will be reflected in Data View of Report Page.

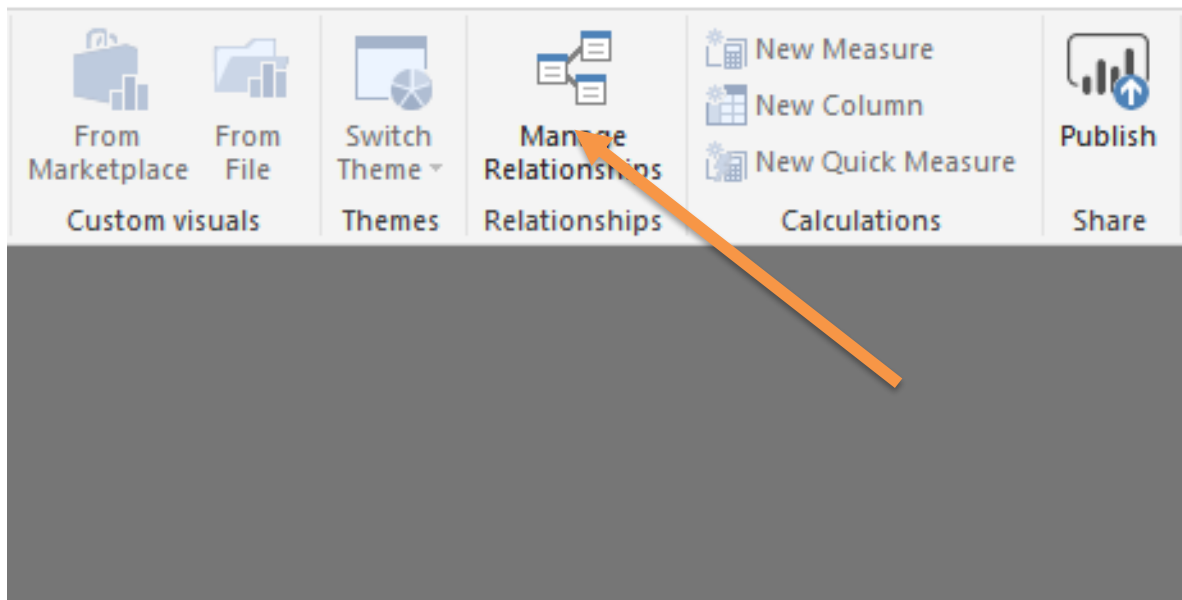
## Query Relationship

Once data are sorted and formatted, you are ready to create visuals. These data aggregated from different sources are made to work together. This process of **modelling** leads you to the final report. A great feature of Power BI is the **relationship** between tables. It is not necessary to have all data flattened to one table for Power BI to work on. You can have data on multiple tables from multiple sources. A relationship is defined between these tables with which Power BI relates data from these different sources allowing it to create interesting visuals and reports.

To see a diagrammatic view of your data, use the **Relationship view**, found on the far-left side of the screen next to the Report canvas shown by arrow in the picture.



In this relationship view, each block represents a data table/ query with columns listed in that. Lines between them represents a relationship. To add relationship between tables, drag and drop the fields that you want to link between the tables. To remove a relationship, right-click on it and select *delete*. For detailed view of data relationships, use **Manage Relationships** option at top pane of report page.



## Edit Relationship

This option will pop up a window that lists relationships between data tables and options to edit it. This is shown in the below

Columns with which relationship exists between the data tables

figure

Activities

WBS	Task Name	Predecessors	Duration	% Complete	Resource Names	Start
1.1.1	Scope definition	null	3	1	Sponsor,Stakeholders	01 June 2018
1.1.2	Charter	2	3	1	Product Engineer,Project Manager	04 June 2018
1.1.3	Charter approval	3	6	1	Stakeholders ,Sponsor	07 June 2018

Resource

Resource Name	Type	Initials	Group	Max. Units	Std. Rate (\$/hr)	Ovt. Rate (\$/hr)
Document Controller	Work	D	Document Management	1	32	
Project Management Team	Work	PMT	project Management	1	500	
Electronic Technician	Work	ET	Facility	1	18	

Cardinality: Many to one (\*:1)

Cross filter direction: Single

☒ Make this relationship active

☐ Assume referential integrity

☐ Apply security filter in both directions

OK Cancel

You can choose different valid columns to build a new relationship between the tables. But duplicate values within cells under a column will not allow to build relationships using it. Cardinality defines how data tables are related to each other. This is highlighted in the figure. Cardinality of a relationship can have 3 values.

- One to one (1:1)
- One to many (1:\*)
- Many to one (\*:1)

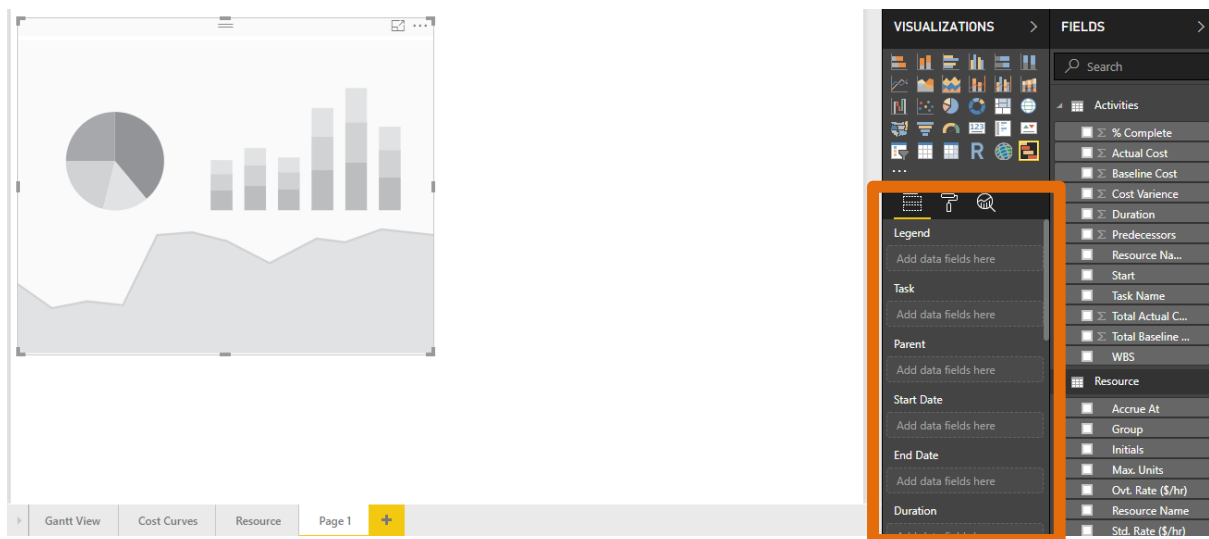
**Many to One (\*:1) / One to Many (1:\*)** - This is the most common, default type. This means the column in one table can have more than one instance of a value, and the other related table, often known as the Lookup table, has only one instance of a value.

**One to One (1:1)** - This means the column in one table has only one instance of a value, and the other related table has only one instance of a value.

On checking “**Make this relationship active**” option, the current relationship serves as the active, default relationship. In cases where there is more than one relationship between two tables, the active relationship provides a way for Power BI Desktop to automatically create visualizations that include both tables.

## Report Generation

To get started creating a report with the data model we created, open the **Report** view in Microsoft Power BI Desktop. Now we need to add visualizations to the report page. To create a visualization, select a visualization option from the **Visualizations** pane.



We should provide values to parameters of visualization option selected. Those parameters will be listed in Visualizations pane, as highlighted in the figure. Drag values from respective table of **FIELDS** pane to these parameters. Based on the parameter value, visualization builds up.

The below table represents a project to build a car. The work packages are identified for this project, represented by each WBS. Predecessors and duration are defined for this project. Project have start date on 1<sup>st</sup> June 2018. Resource allocation is also mentioned in the data table. With that, cost has been calculated. Resource data is also mentioned in a different table. This Activities table is used as a data source for creating Activities report in Power BI. The column names are displayed at FIELDS section of Report Page. As you drag a column name to parameterize a visualization, data under that column will be utilized to shape view for the visualization. This is a MS Excel sheet which I used as data source for plotting Gantt Bars for each work packages based on its schedule and duration.

WBS	Task Name	Predecessors	Duration	% Complete	Resource Names	Start	Baseline Cost	Total Baseline Cost	Actual Cost	Total Actual Cost	Cost Variance
1.1.1	Scope definition		3	100%	Sponsor,Stakeholders	01-06-2018	\$0	\$0	\$0	\$0	\$0
1.1.2	Charter	2	3	100%	Product Engineer,Project Manager	04-06-2018	\$4,800	\$4,800	\$4,800	\$4,800	\$0
1.1.3	Charter approval	3	6	100%	Stakeholders,Sponsor	07-06-2018	\$0	\$4,800	\$0	\$4,800	\$0
1.2.1	First cut technical design	4	3	100%	Product Engineer	13-06-2018	\$1,920	\$6,720	\$2,040	\$6,840	\$120
1.2.2	Electrical engineering	5	30	100%	Electrical Engineer	16-06-2018	\$24,000	\$30,720	\$24,256	\$31,096	\$256
1.2.3	Mechanical engineering	5	30	100%	Mechanical Engineer	13-07-2018	\$24,000	\$54,720	\$24,245	\$55,341	\$245
1.2.4	Structural engineering	5	30	100%	Structural Engineer	16-07-2018	\$24,000	\$78,720	\$24,100	\$79,441	\$100
1.2.5	Final review	8	5	100%	Product Engineer,Project Manager	15-08-2018	\$8,000	\$86,720	\$8,200	\$87,641	\$200
1.2.6	Complete design documentation	9	20	100%	Product Engineer,Project Manager	20-08-2018	\$32,000	\$1,18,720	\$32,521	\$1,20,162	\$521
1.3.1	Master Bill of Material	9	15	100%	Project Controller,Accountant	20-08-2018	\$16,800	\$1,35,520	\$16,852	\$1,37,014	\$52
1.3.2	Parts ordered	9	10	100%	Procurement Engineer	20-08-2018	\$6,080	\$1,41,600	\$6,628	\$1,43,642	\$548
1.3.3	Procurement cycle	12	60	100%	Vendor	30-08-2018	\$0	\$1,41,600	\$0	\$1,43,642	\$0
1.4.1	Setup Assembly line	9	45	100%	Electronic Technician,Technicians	20-08-2018	\$30,240	\$1,71,840	\$35,096	\$1,78,738	\$4,856
1.4.2	Power train	14	10	100%	Electronic Technician	04-10-2018	\$3,840	\$1,75,680	\$4,325	\$1,83,063	\$485
1.4.3	Frame	14	15	100%	Welder,Technicians	04-10-2018	\$7,920	\$1,83,600	\$8,004	\$1,91,067	\$84
1.4.4	Body	14	10	100%	Laborer,Foreman	04-10-2018	\$1,600	\$1,85,200	\$2,145	\$1,93,212	\$545
1.4.5	Instruments	13	8	100%	Laborer,Foreman	29-10-2018	\$1,280	\$1,86,480	\$1,335	\$1,94,547	\$55
1.4.6	Paint and Trim	17	5	100%	Painter,Asthetic Designer,Laborer	14-10-2018	\$3,680	\$1,90,160	\$4,245	\$1,98,792	\$565
1.4.7	Final assembly	19	10	100%	Asthetic Designer,Laborer,Technicians	19-10-2018	\$7,360	\$1,97,520	\$8,242	\$2,07,034	\$882
1.5.1	Test plan	13	5	100%	Reliability Engineer,Quality Engineer	29-10-2018	\$5,600	\$2,03,120	\$6,452	\$2,13,486	\$852
1.6.1	Power train testine	16	12	100%	Electronic Technician,Reliability	19-10-2018	\$12,288	\$2,15,408	\$12,746	\$2,26,232	\$458
1.6.2	Frame testing	16	20	100%	Reliability Engineer[50%],Mechanical Technician	19-10-2018	\$14,880	\$2,30,288	\$15,735	\$2,41,967	\$855
1.6.3	Body integrity testing	17	10	100%	Structural Engineer	14-10-2018	\$8,000	\$2,38,288	\$8,555	\$2,50,522	\$555
1.6.4	Instrument testing	18	10	70%	Instrumentation Engineer,Reliability Engineer	06-11-2018	\$14,400	\$2,52,688	\$22,653	\$2,73,175	\$8,253
1.6.5	System testing	25	10	0%	Systems engineer,Product Engineer	16-11-2018	\$12,800	\$2,65,488	\$13,800	\$2,86,975	\$1,000
1.6.6	Safety testing	26	15	0%	Safety engineer	26-11-2018	\$9,600	\$2,75,088	\$10,457	\$2,97,432	\$857
1.7.1	Admin close	26	5	0%	Project Management Team	26-11-2018	\$8,000	\$2,83,088	\$8,858	\$3,06,290	\$858
1.7.2	Project archivin	26	5	0%	Document Controller ,Technical Writer	26-11-2018	\$4,800	\$2,87,888	\$5,384	\$3,11,674	\$584
1.8.0	Project Management		196	84%	Project Management Team	01-06-2018	\$0	\$2,87,888	\$0	\$3,11,674	\$0
1.9.0	Project Close	29	1	0%	Project Management Team	01-12-2018	\$0	\$2,87,888	\$0	\$3,11,674	\$0

Let's prepare a **Gantt view** in Power BI report. Choose the Gantt view option from Visualization pane. For the parameters, pick the appropriate columns from data table.

When I selected Gantt Visualization option, all set of parameters required to plot Gantt Bars were listed under Visualization pane. Under each parameter, field to add table columns from FIELDS section was displayed along. You can add multiple values for these parameters if required. Among those available options, I have used 5 parameters to shape Gantt view. **Task** parameter field is assigned with *Task Name* column. For this, drag *Task Name* column from FIELDS pane to *Task* field at VISUALIZATIONS pane. This process of dragging column names is used to parameterize visualizations. With this, column used to parameterize visualization will be checked with yellow in colour. Vertical axis of Gantt View gets values of work packages/ tasks mentioned in data table. **Start Date** is assigned with *Start* column of data table. This will make a mark at every task start date, pointing start of every work package. Horizontal distribution of Gantt view is based on dates. On assigning **Duration** with *Duration* column, makes the bars to grow horizontally from start point of every work package. This builds Gantt bars in the view. A black line in between these bars represents task **Completion** in percentage. For plotting these black lines to Gantt bars, drag *%Complete* column to Completion parameter. When you assign **Resource** parameter with table column "*Resource names*", it gives you resource names displayed for each Gantt bars. All visualization options are built with similar procedure of assigning values to parameters.

Below figure shows a diagrammatic idea on how visualizations are parameterized.

### VISUALIZATIONS

#### Legend

Add data fields here

**Task**

Task Name

**Parent**

Add data fields here

**Start Date**

Start

**End Date**

Add data fields here

**Duration**

### FIELDS

**Activities**

- ☒ % Complete
- ☐ Actual Cost
- ☐ Baseline Cost
- ☐ Cost Variance
- ☒ Duration
- ☐ Predecessors
- ☒ Resource Na...
- ☒ Start
- ☒ Task Name
- ☐ Total Actual C...
- ☐ Total Baselin...
- ☐ WBS

**Resource**

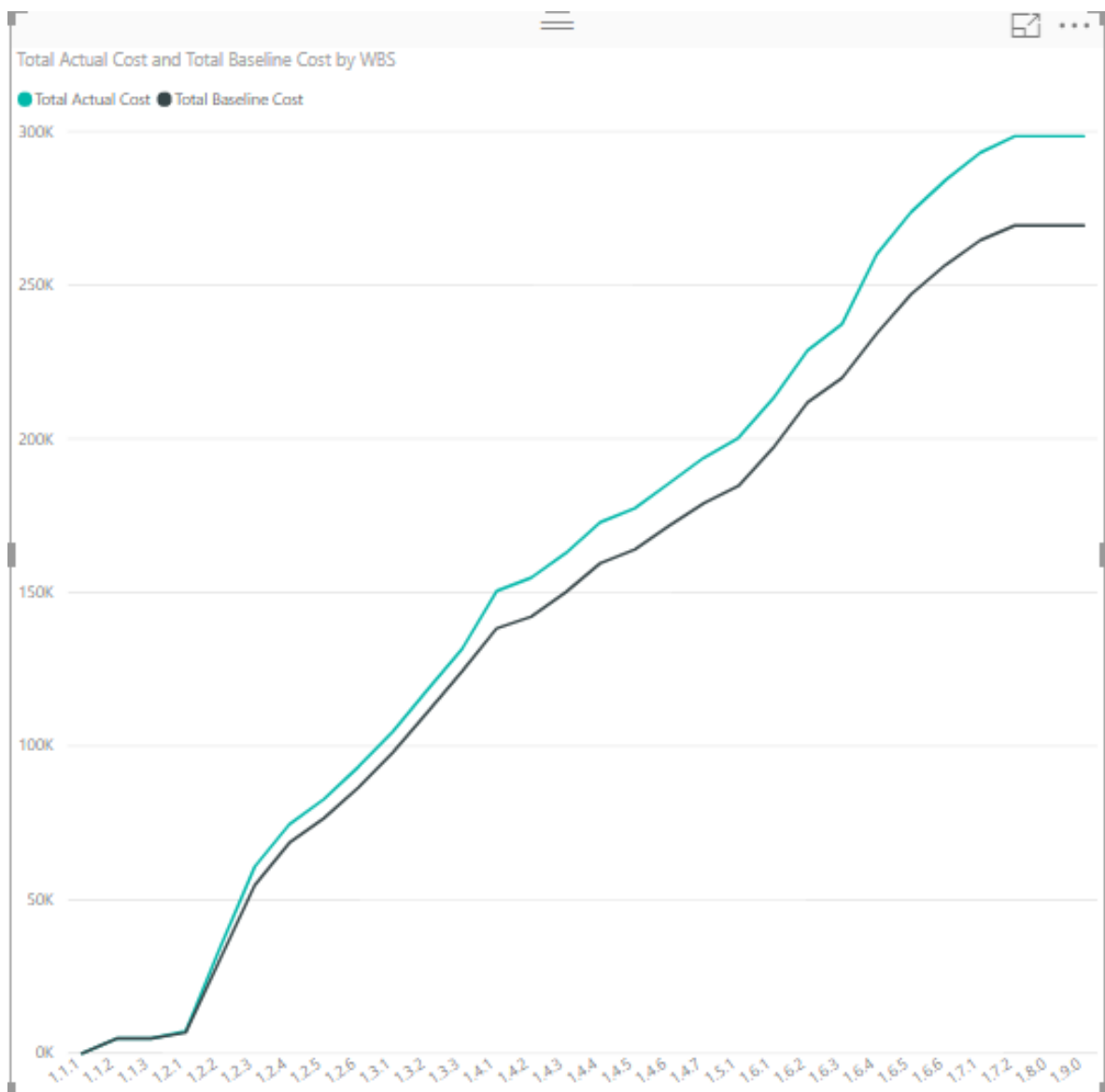
- ☐ Accrue At
- ☐ Group
- ☐ Initials
- ☐ Max. Units
- ☐ Ovt. Rate (\$/hr)
- ☐ Resource Name
- ☐ Std. Rate (\$/hr)

Duration and % Complete by Task Name, Start and Resource Names

Task	Start Date	End Date	Duration	% Completion	Resource
Procurement					
Power train					
Body					
Frame	10/4/2018 12:00:00 AM	10/19/2018 12:00:00 AM	15 Days	100%	Welder, Technicians
Paint and Trim					
Body integrit...					
Final assembly					
Power train t...					
Frame testing					
Instruments					
Test plan					
Instrument te...					
System testing					
Project archivin					
Admin close					
Safety testing					
Project Close					

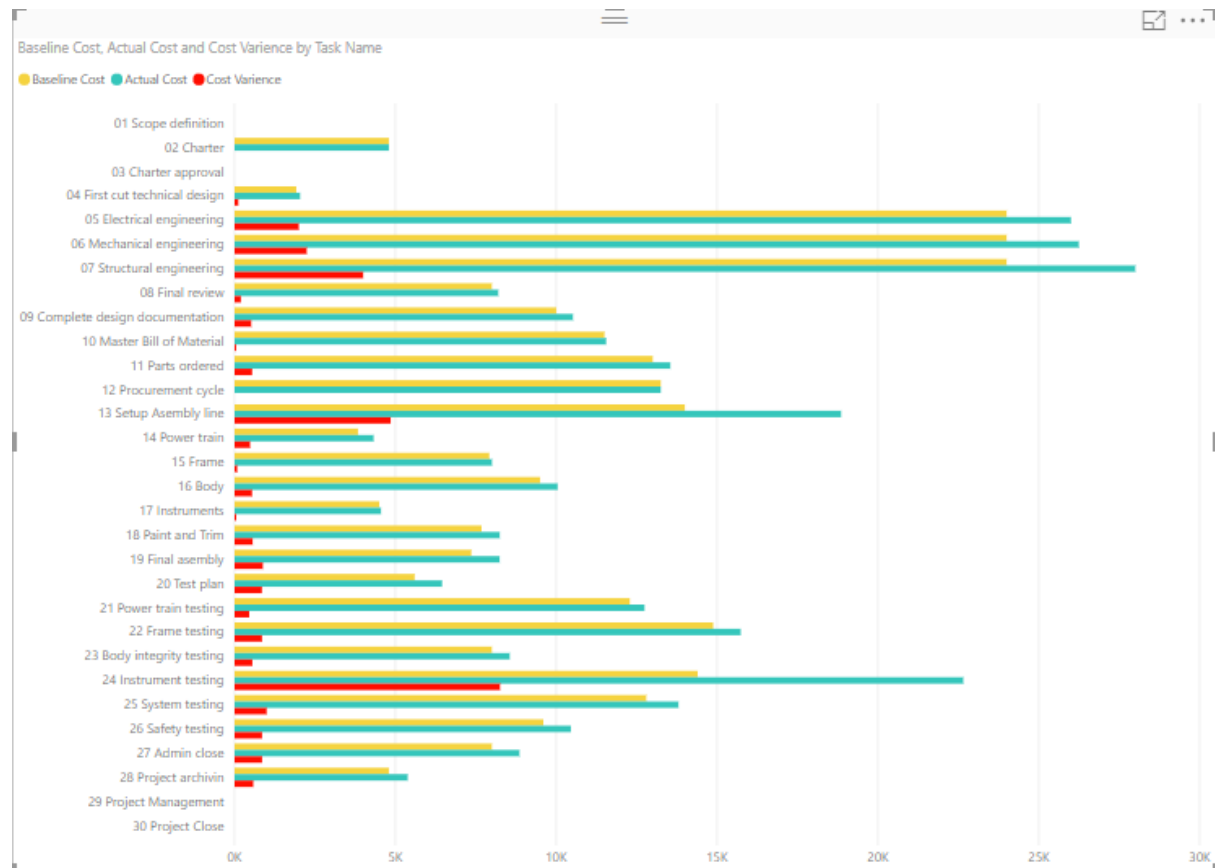
Above figure shows the resulting Gantt view for the project. For each work package / task, a bar exists in the Gantt view obtained. Vertical axis lists all related Work Packages of project and horizontal axis represents project days, from project start date till end date. The vertical dashed line shows current date. When you place mouse causer on any bar, work package details pop up as shown in the figure. In figure, "frame" task has a start date on 4<sup>th</sup> October 2018 and ends on 19<sup>th</sup> October 2018. Duration is mentioned as 15 days with status as 100% complete. Resources allocated are also displayed in the pop up. In the visualization, it is also visible that task "Instrument Testing" is still in progress which was supposed to finish by current date. With that black line showing % completion did not reach till bar end. Even succeeding task was not started as it has above mentioned task as predecessor.

Similarly, a report with project progress curve and project cost are also built as show below. Below curve shows project cost plotted against work packages assuming that each task progresses one after the other (an indirect representation of time). This is a S-Curve that details project progress.





Project baseline cost and actual costs are plotted in the **line chart**. As like Gantt view prepared, Line chart parameters are assigned with appropriate values to produce this view. This is plotted on WBS v/s Actual and Baseline costs. As you can see, with the project progresses, resources get added up and this made a raise in cost of project. Raise in the chart line represents this increase in costs. Black line represents baseline cost and green represents actual cost.



**Clustered bar chart** represents actual and baseline costs for each task along with cost variance represented by red bar. Yellow bars and green bars represent baseline and actual costs respectively. As the bars grows long, the red line becomes longer which represents a greater variance between baseline and actual costs. Same procedure of dragging column names to Visualization parameters was done to plot the bar chart. This chart is plotted with work package (task) against cost (\$).

Resource Name
<input type="checkbox"/> (Blank)
<input type="checkbox"/> Accountant
<input type="checkbox"/> Asthetic Designer
<input type="checkbox"/> Document Controller
<input type="checkbox"/> Electrical Engineer
<input type="checkbox"/> Electronic Technician
<input type="checkbox"/> Foreman
<input type="checkbox"/> Instrumentation Engineer
<input type="checkbox"/> Laborer
<input type="checkbox"/> Mechanical Engineer
<input type="checkbox"/> Mechanical Technician
<input type="checkbox"/> Painter
<input type="checkbox"/> Procurement Engineer
<input type="checkbox"/> Product Engineer
<input type="checkbox"/> Project Controller
<input type="checkbox"/> Project Management Team
<input checked="" type="checkbox"/> Project Manager
<input type="checkbox"/> Quality Engineer
<input type="checkbox"/> Reliability Engineer
<input type="checkbox"/> Safety engineer
<input type="checkbox"/> Sponsor
<input type="checkbox"/> Stakeholders
<input type="checkbox"/> Structural Engineer
<input type="checkbox"/> Systems engineer
<input type="checkbox"/> Technical Writer
<input type="checkbox"/> Technicians
<input type="checkbox"/> Vendor
<input type="checkbox"/> Welder

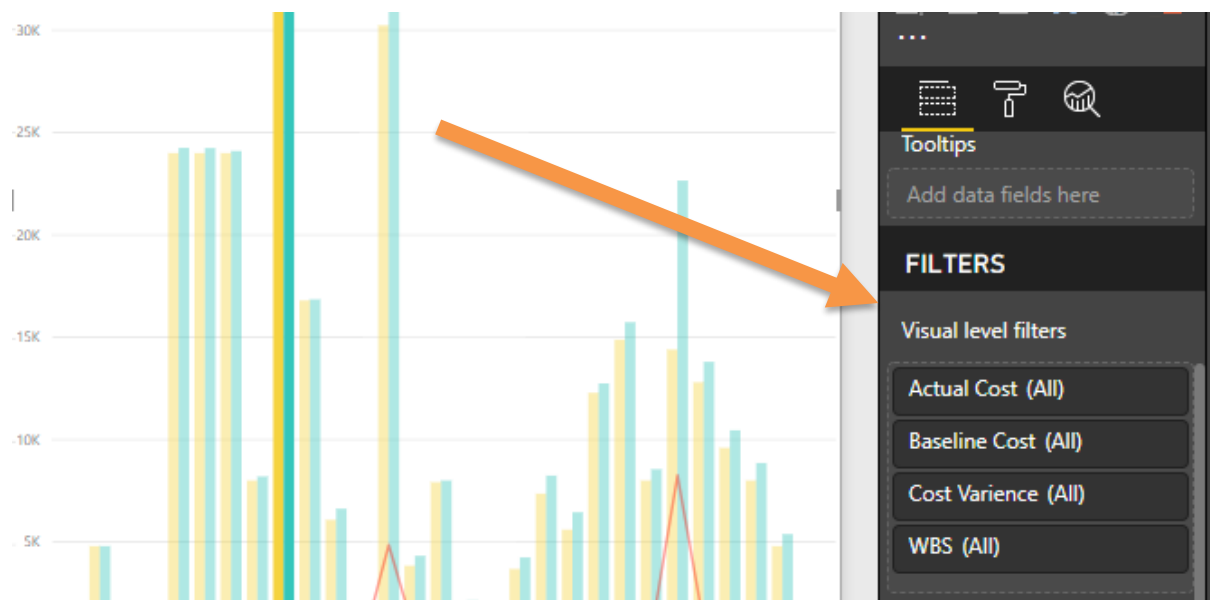
60

Min of Std. Rate (\$/hr)

70

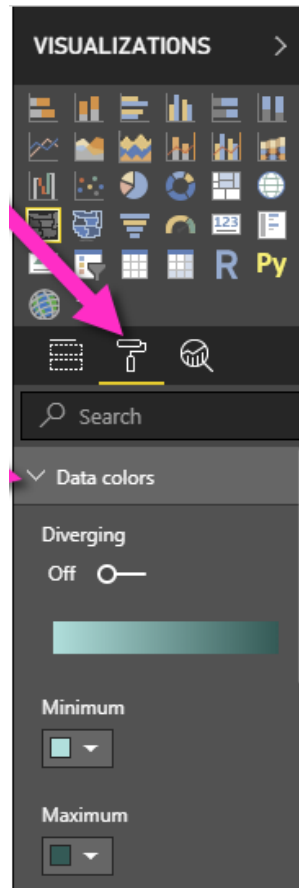
Max of Ovt. Rate (\$/hr)

This picture shows a report prepared for Resources used in the project. When you click on the resource name listed using **Slicer**, Standard rate and Over-time rate for that resource will be displayed in green and red colours respectively. These are implemented using **Card** visualization option in Power BI. This feature of interactive visualization makes Power BI so feasible for data analysis. When you select one of the visualizations, the **Fields and Filters** pane shows which fields are selected and the structure of the visualization.



## Editing Visualization

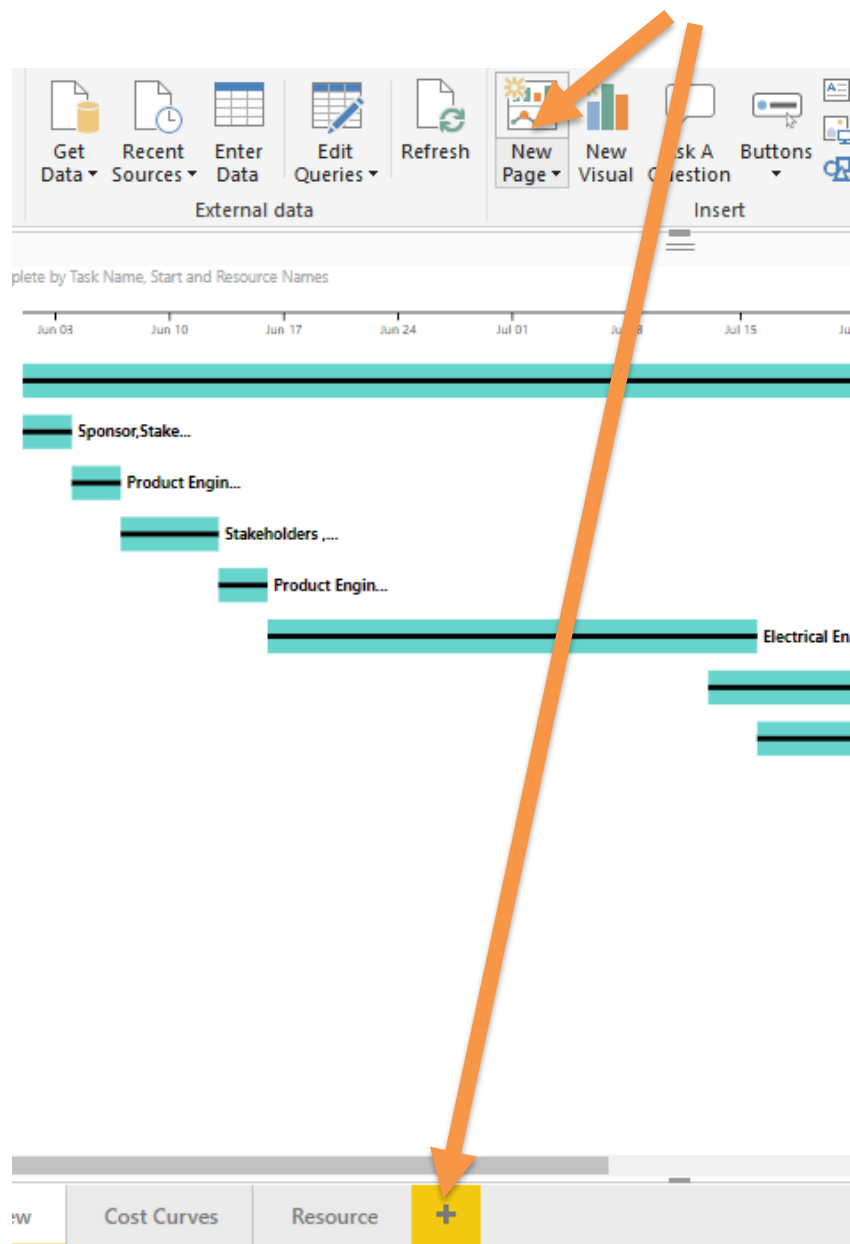
To adjust the colours used in visualizations, select the **Format** tab (looks like a paint roller) in the **Visualizations** pane, and expand **Data colours** to adjust. Moreover, several edit options like text size, colour, border options etc., are available for these visualizations.



You can adjust the size of a visual by dragging its corners or sides. Other editing options include changing the visual type, adding fields, changing the colours, or arranging the visual on the canvas. All these changes are fun to do, easy to undo, and quick to take effect. All reports have at least one blank page to begin with. Pages appear in the navigation pane just to the left of the canvas. You can add all sorts of visualizations to a page, but it's important not to overdo it. Too many visualizations on a page will make it look busy and will also make the correct information difficult to find.

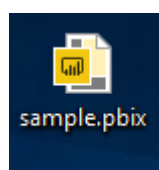
To add a page to your report, just select **New Page** on the ribbon, or select the plus sign (+) next to the last report page.

## Options to add new report page



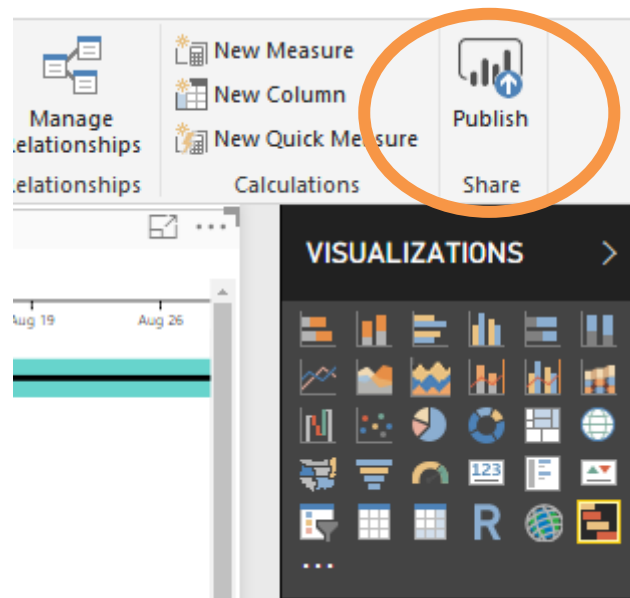
## Share a Power BI report

With your power bi desktop, connect to your data, shape the data and use those to create reports. When these steps are finished, you can save your work in power bi desktop file format, which uses '.pbix' extension. These files can be shared like other files, but the usual way is to upload them to the Power BI Service.



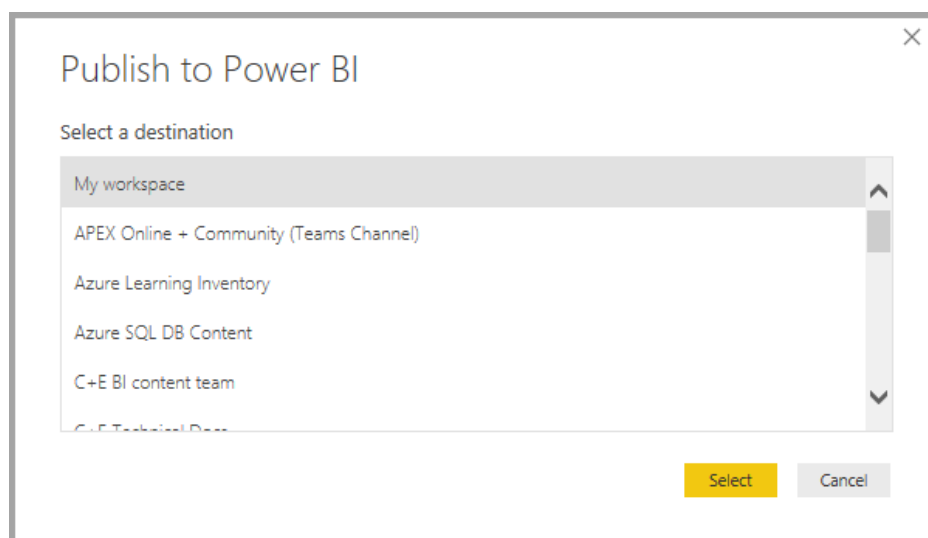
Now that we have a Microsoft Power BI Desktop report that's reasonably complete (or at least ready to move ahead with), we can share it with others by using the **Power BI service**. There are a few ways to share your work in Power BI Desktop. You can publish to the Power BI service, upload the '.pbix' file directly from the Power BI service, or save the .pbix file and send it like any other file. You can also export a report to a Microsoft PowerPoint file, and can even create a PDF file of your report.

To publish reports to the Power BI service, select **Publish** on the **Home** tab on the ribbon.

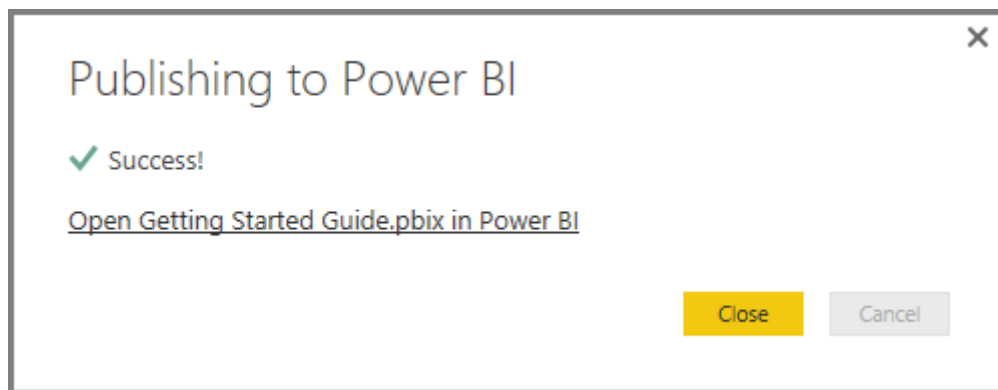


The next window that appears asks for a destination for your published report. You can publish a report to a workspace that's accessible to your entire organization (and therefore share your report with everyone in your organization), or you can publish it to other available workspaces. The workspaces you see depend on the workspaces that are available to you and your organization.

You can also share the report just in your own workspace (called *My Workspace*). From there, you can do more with it in the Power BI service (including sharing it more broadly).

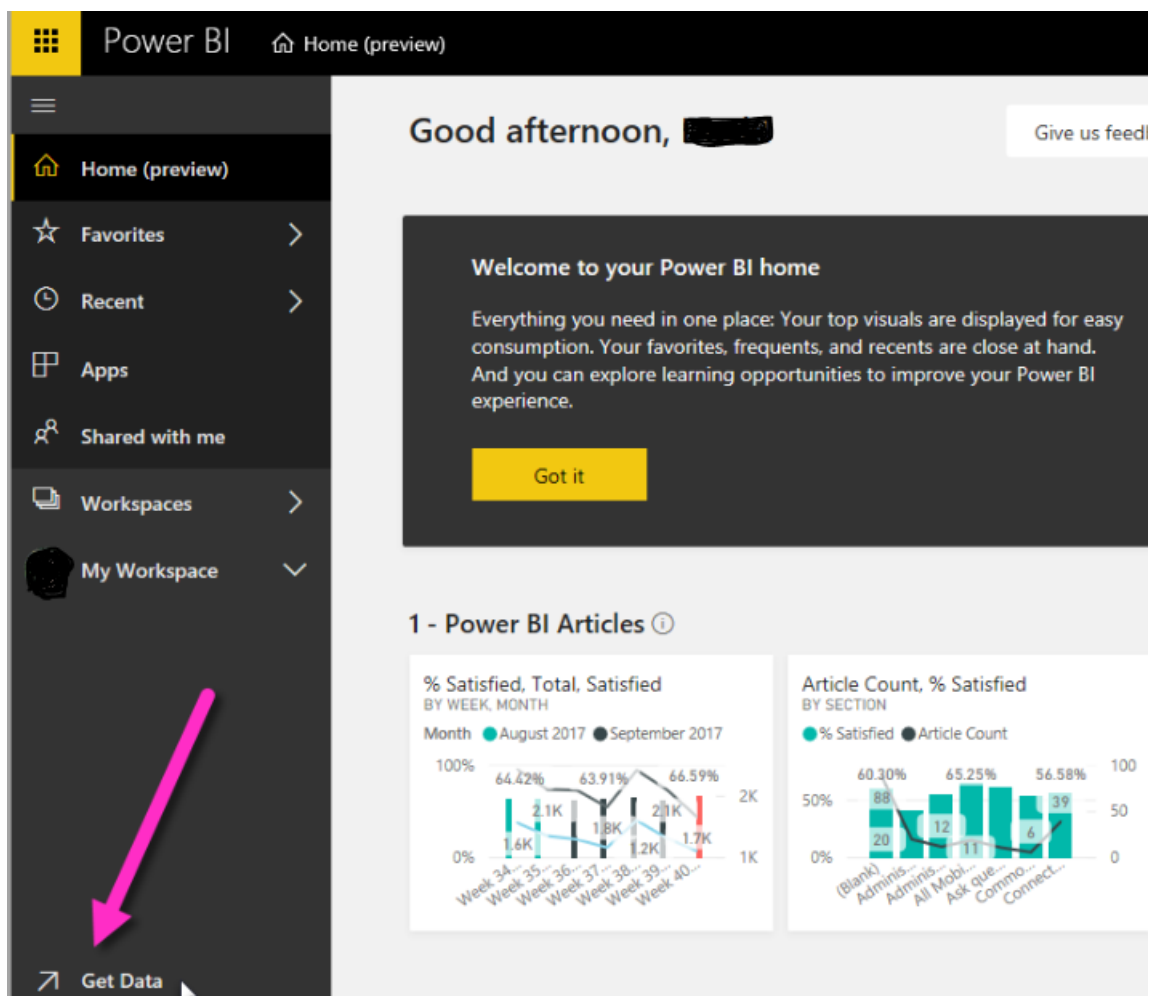


When you've signed in and the publish process is finished, you'll see the following dialog box.

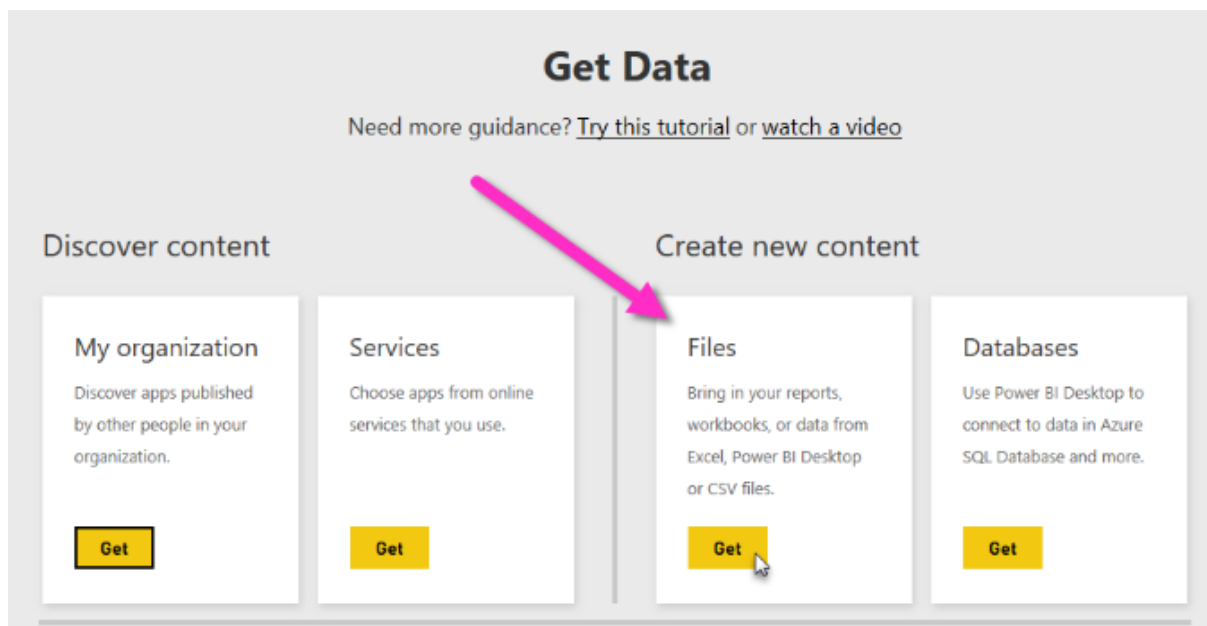


## Power BI Service

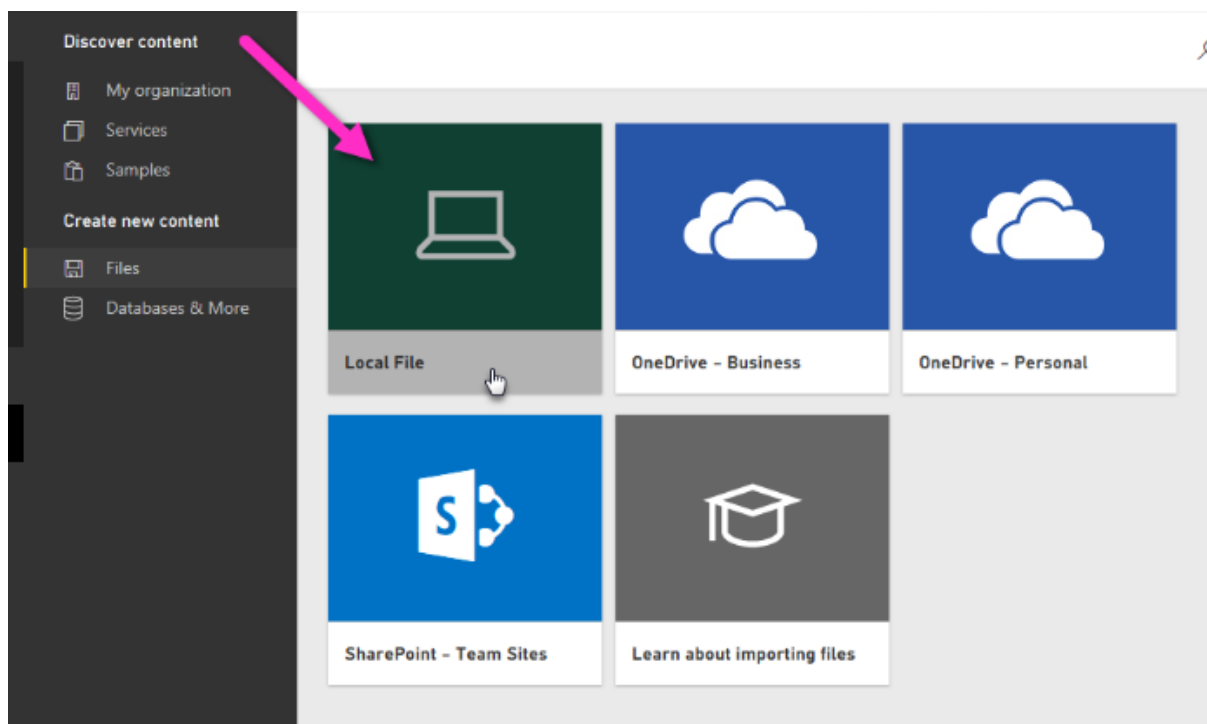
When you sign in to Power BI service, you'll see the Power BI Desktop file you just loaded in the **Dashboards**, **Reports**, and **Datasets** sections of the service. Another way to share your work is to load it from within the **Power BI service**. The link <https://app.powerbi.com> opens the **Power BI service** in a browser. Select **Get Data** to start the process of loading your Power BI Desktop report in the Power BI service.



On the **Get Data** page that appears, you can select where to get your data from. In our case, we'll select **Get** in the **Files** box.

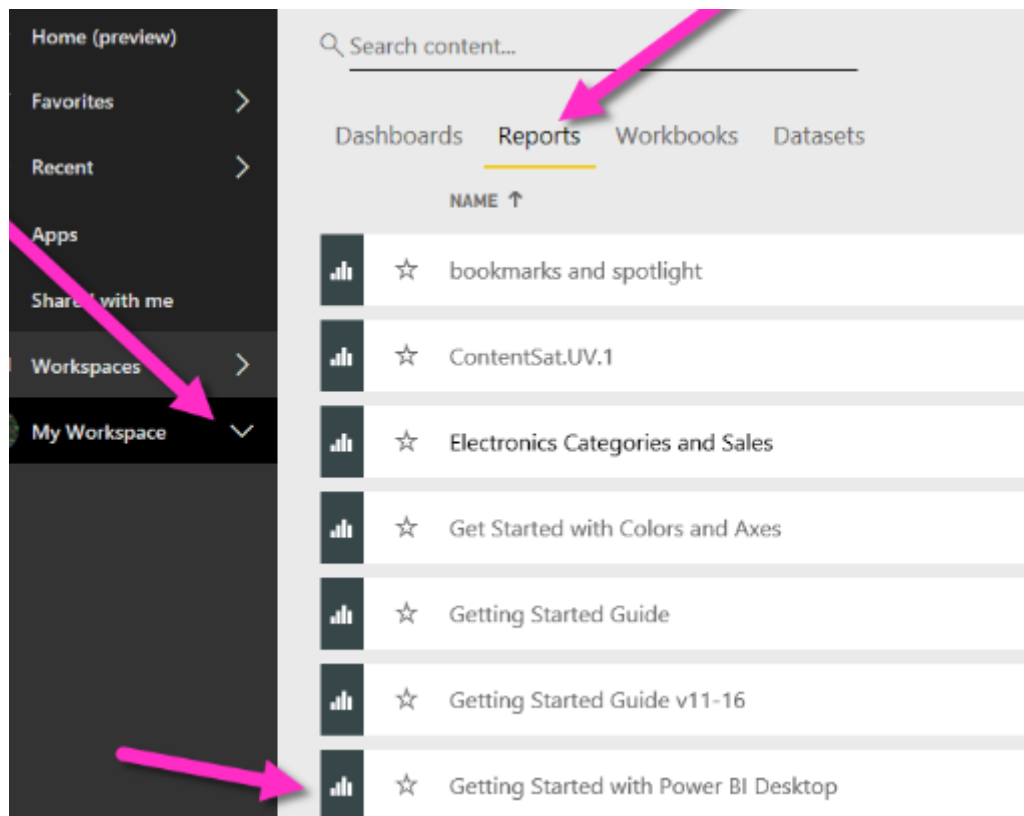


The **Files** view appears. In our case, we'll select **Local File**.



After you select the file, Power BI uploads it. After the file is uploaded, you can select it. In the Power BI service, select **My Workspace** in the left pane, and then select the **Reports** tab to show all your reports.

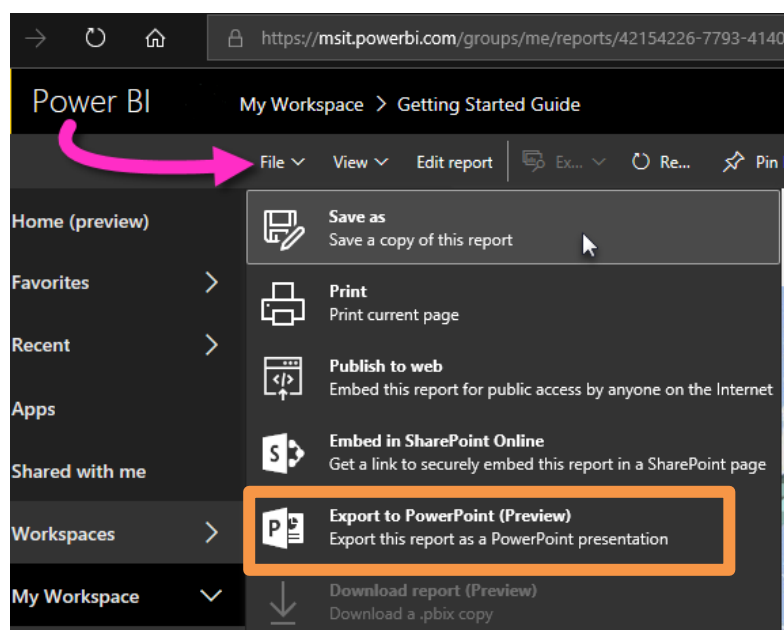




When you select the report (by selecting its name), the **Power BI service** shows it. You can change a report in the **Power BI service** by selecting **Edit Report** at the top of the report canvas. To save your report, select **File > Save As** in the service as shown in the picture.

## Export Power BI Report

You can choose to export your report as a PowerPoint presentation so that you can share your report with others during presentation.



Choose Export to PowerPoint option. After the export process is finished, Power BI tell you where the PowerPoint file was saved and lets you know that it's ready to be shared with others.

## **References**

This report has covered the basics of Power BI, creating an idea on what is Power BI and how to use it for adopting business intelligence in your project. You are good to go with creating a smart report and share it to your team. Use the following references for further details on this topic.

<https://powerbi.microsoft.com/en-us/>

[https://en.wikipedia.org/wiki/Power\\_BI](https://en.wikipedia.org/wiki/Power_BI)

<https://community.powerbi.com/t5/Desktop/bd-p/power-bi-designer>

<https://www.youtube.com/channel/UCy--PYvwBwAeuYaR8JLmrfq>

[https://www.udemy.com/learn\\_power\\_bi\\_for\\_free/](https://www.udemy.com/learn_power_bi_for_free/)