

COMPREHENSIVE GUIDE TO INTERVIEWS FOR DATA SCIENCE



Power BI



ZEP ANALYTICS

Introduction

We've curated this series of interview guides to accelerate your learning and your mastery of data science skills and tools.

From job-specific technical questions to tricky behavioral inquiries and unexpected brainteasers and guesstimates, we will prepare you for any job candidacy in the fields of data science, data analytics, or BI analytics.

These guides are the result of our data analytics expertise, direct experience interviewing at companies, and countless conversations with job candidates. Its goal is to teach by example - not only by giving you a list of interview questions and their answers, but also by sharing the techniques and thought processes behind each question and the expected answer.

Become a global tech talent and unleash your next, best self with all the knowledge and tools to succeed in a data analytics interview with this series of guides.



COMPREHENSIVE GUIDE TO INTERVIEWS FOR DATA SCIENCE



Data Science interview questions cover a wide scope of multidisciplinary topics. That means you can never be quite sure what challenges the interviewer(s) might send your way.

That being said, being familiar with the type of questions you can encounter is an important aspect of your preparation process.

Below you'll find examples of real-life questions and answers. Reviewing those should help you assess the areas you're confident in and where you should invest additional efforts to improve.

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1. What is business intelligence?

Business intelligence is a technology-driven method. It helps you to analyze data and to provide actionable information which in turn helps corporate executives, business managers, and other users to take decisive and data-driven business decisions.

2. What is self-service BI?

Self-service business intelligence (BI) is an approach to data analytics that enables business users to access and explore data sets even if they don't have a background in BI or related functions like data mining and statistical analysis.

3. What is Power BI? Why is Power BI so powerful?

Power BI (PBI) is a collection of Business Intelligence tools, techniques, and processes that are used to extract valuable information by connecting, transforming, and visualizing raw data sets from multiple sources.

It provides the right tools to create interactive dashboards and live reports that can be shared and published on various platforms to help business users and stakeholders make better decisions.

There are many features in Power BI. The most notable ones are:

- It allows users to transform data into visuals and share those visuals with colleagues
- It allows users to explore and analyze data from all sources
- It allows users to scale across organizations with built-in governance and security.
- Once an output is generated, users can display the same in multiple devices that are compatible with the Power BI application
- With Power BI natural language processing, users can perform queries on reports using simple English words.

4. What are the various components of Power BI?

- Power Query: It allows you to discover, access, and consolidate information from different sources.
- Power Pivot: A modelling tool.
- Power View: It is a presentation tool for creating charts, tables, and more.
- Power Map: Helps you to create geospatial representations of your data.
- Power Q&A: Allows use of natural language to get answers to questions.

5. What are reports in Power BI?

A Power BI report is a multi-perspective view into a dataset, with visuals that represent different findings and insights from that dataset. A report can have a single visual, or pages full of visuals.

6. What are dashboards in Power BI?

A Power BI dashboard is a single page, often called a canvas, that uses visualizations to tell a story. Since it is limited to one page, a well-designed dashboard contains only the most important elements of that story.

7. What is a DAX function?

It is a formula expression language called DAX that can be used with various visualization tools like Power BI. It is also known as a functional language, where the full code is kept inside a function.

8. What is M language?

It is a programming language used in Power Query. It's a functional, case-sensitive, language which is similar to other programming languages and easy to use.

9. What are two types of connectivity?

The two connectivity modes are Import Mode and Direct Query Mode.

10. Explain the various data sources that can be used in Power BI.

The list of data sources for Power BI is extensive, but it can be grouped into the following:

- Files: Data can be imported from Excel (.xlsx, xlsm), Power BI Desktop files (.pbix), and Comma Separated Value (.csv).
- Content Packs: It is a collection of related documents or files that are stored as a group. In Power BI, there are two types of content packs: firstly, those from services providers like Google Analytics, Marketo or Salesforce and secondly, those created and shared by other users in your organization.
- Connectors to databases and other datasets such as Azure SQL, Server Analysis Services tabular data, etc.

11. What are the various components in the architecture of Power BI?

- 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.

- 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, conduct data modelling and create reports.

You can download and install Power BI Desktop in your system for free. Using Power BI Desktop features, one can do data cleansing, create business metrics and data models, define the relationship between data, define hierarchies, create visuals and publish reports.

- 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.

Power BI Service is also known as, “Power BI.com”, “Power BI Workspace”, “Power BI Site” and “Power BI Web Portal”.

This component also offers advanced features like natural language Q&A and alerts.

- Power BI Report Server

The Power BI Report Server is similar to the Power BI Service. The only difference between these two is that Power BI Report Server is an on-premise platform. It is used by organizations who do not want to publish their reports on the cloud and are concerned about the security of their data.

Power BI Report Server enables you to create dashboards and share your reports with other users following proper security protocols. To use this service, you need to have a Power BI Premium license.

- Power BI Gateway

This component is used to connect and access on-premise data in secured networks. Power BI Gateways are generally used in organizations where data is kept under security and watch. Gateways help to extract out such data through secure channels to Power BI platforms for analysis and reporting.

- Power BI Mobile

Power BI Mobile is a native Power BI application that runs on iOS, Android, and Windows mobile devices. These applications are used for viewing reports and dashboards.

- Power BI Embedded

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

12. What are the building blocks of Power BI?

- Visualizations

Visualizations are a visual representation of data.

Examples: Pie Chart, Line Graph, Side by Side Bar Charts, Graphical Presentation of the source data on top of Geographical Map, Tree Map, etc.

- Datasets

Datasets are a collection of data that Power BI uses to create its visualizations. Examples: Excel sheets, Oracle or SQL server tables.

- Reports

Reports are a collection of visualizations that appear together on one or more pages. Examples: Sales by Country, State, City Report, Logistic Performance report, Profit by Products report etc.

- Dashboards

Dashboards are a single layer presentation of multiple visualizations, i.e we can integrate one or more visualizations into a one page layer.

- Tiles

Tiles are a single visualization in a report or on a dashboard. Example: Pie Chart in a Dashboard or Report.

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13. Explain .pbix file format.

A PBIX file is a document created by Power BI Desktop. It contains queries, data models, visualizations, settings, and reports added by the user.

The PBIX file is the primary file type created by Power BI Desktop along with the .PBIT template. The file is used to store all of the data visualization information.

PBIX files are saved in the Office XML format, which is used to save .DOCX, .XLSX, and .PPTX files. The format stores a PBIX file as a collection of files and folders in a compressed zip package. If you need to manually view the contents, you can rename the ".pbix" extension to ".zip" to create a .ZIP file and then extract the contents of the file.

14. What are the various views in Power BI Desktop?

There are three different views in Power BI, each of which serve a different purpose.

- Report View: Users can add visualizations and additional report pages and publish the same on the portal from here.
- Data View: Data shaping can be performed through Query Editor tools.
- Relationship View: Users can manage relationships between datasets in this view.

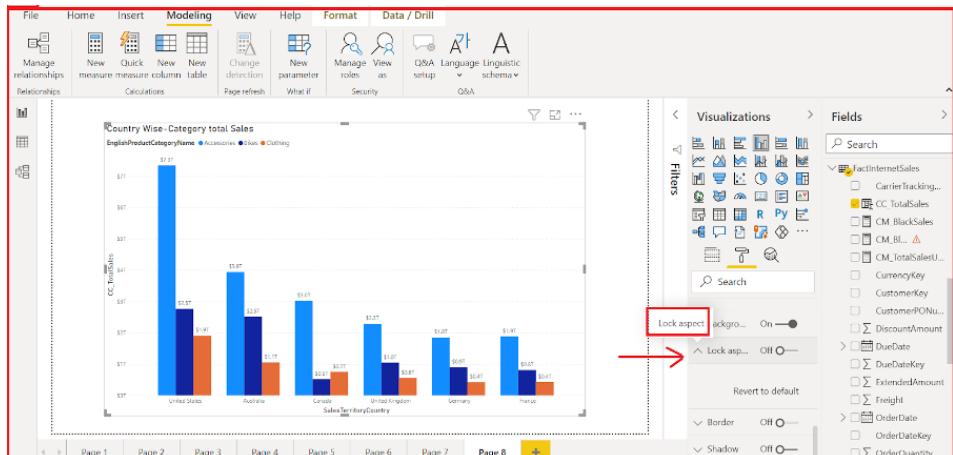
15. What are the various features of PBI Query editor?

- Connect to data
- Shape and combine data
- Group rows
- Pivot columns
- Create custom columns
- Query formulas

16. What is Lock Aspect in Power BI?

Lock Aspect is used to lock the proportion of a visual when you try to drag through the corners to resize it. So, for example, if you create a visualization chart & turn the Lock Aspect on – and then try to resize it with the help of your mouse, it won't change, and it keeps proportions the same as earlier.

You can find the lock aspect in the Format Tab in the Visualization Pane.



17. What are common data shaping techniques?

The most common data shaping techniques are:

- Removing Columns and Rows
- Adding Indexes
- Applying a Sort Order

18. Where is data stored in PBI?

When data is ingested into Power BI, it is stored in Fact and Dimension tables.

- Fact tables: The central table in a star schema of a data warehouse, a fact table stores quantitative information for analysis and is not normalized in most cases.
- Dimension tables: It is another table in the star schema that is used to store attributes and dimensions that describe objects stored in a fact table.

19. What is the business need for PBI?

You can take the data and create robust reporting very easily. This assists in attracting new clients toward servicing and monitoring the customers already present. It also becomes possible to track information and set goals. Therefore, completely building an extraction, transformation and loading solution ultimately assists the management so they are able to make better decisions in the process.

The return on investment when it comes to Power BI is also very high. Lastly, it makes some of the unwanted data into information, which can be utilized progressively.

20. How can we calculate average in PBI?

Average can be calculated in two ways-

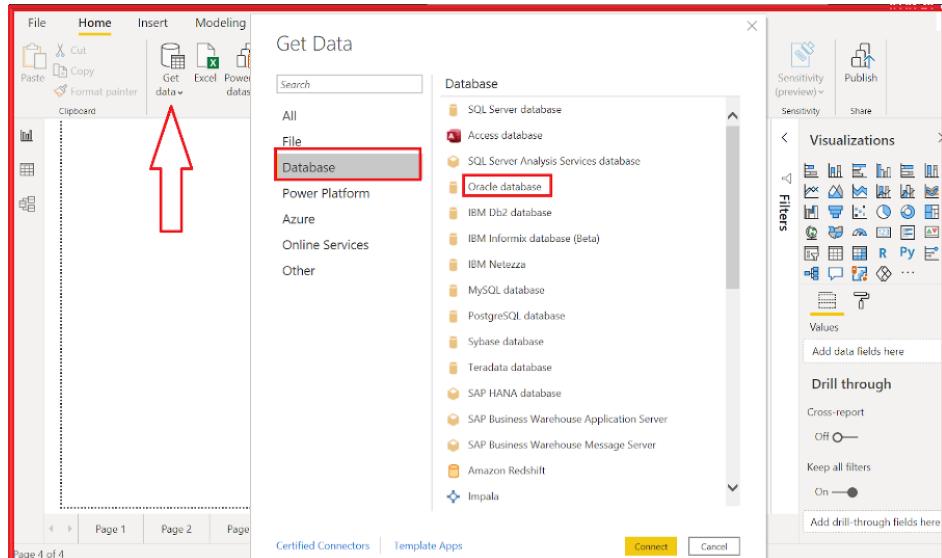
- When we add a measure to a visual; by default, it summarizes any measure. When we click on the drop-down for the measure- we can change from Sum to Average.
- Creating a calculated measure for average using the AVERAGE() DAX function.

21. What is PBI cloud?

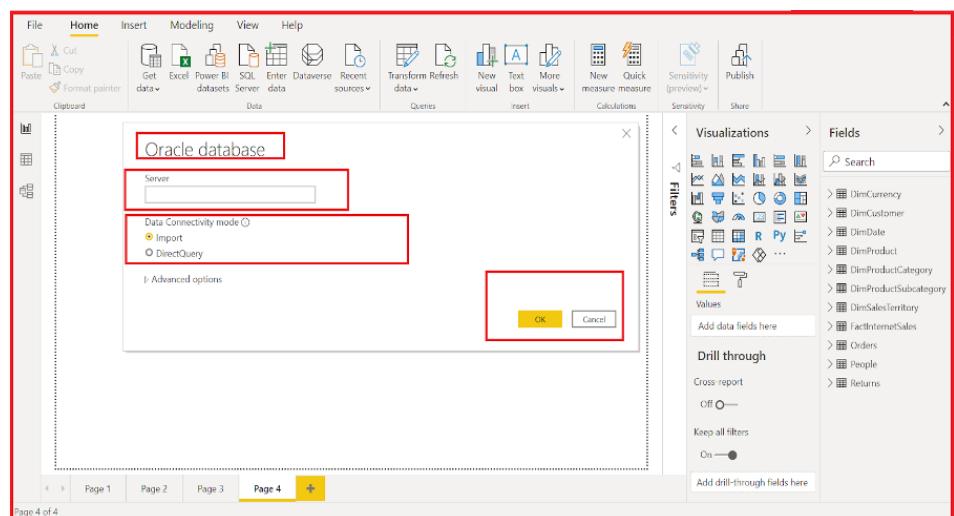
Power BI Cloud is a Cloud-Based Data Visualization set-up which gives access to its users for editing, viewing, creating and sharing the dashboards' reports & datasets across organizations and a group of people by protecting the Admin Rights & Credentials. Access is required to view & edit these reports & dashboards.

22. How can one connect to an Oracle DB in PBI?

To connect to Oracle Databases from a server, you need to open the Power BI desktop in your Machine & click on the get data, under the Home Tab in Ribbon. Once you do so, you will get a list of Files/ Databases & other Sources. To connect to the Oracle databases, click on database, select Oracle database, & click on connect.



Once you do so, you will be asked to give the Server Information that you want to access. Provide those details, select the connectivity Mode-Direct Query or Import Mode, whichever you prefer based on your requirements, & then Click OK.



Once you click on OK, a window will be opened asking your credentials to access the database. By using your credentials (Username/Password), you will then be allowed to access the database, select the Schema/Drag & drop the tables, etc., in the preview section & click to load to view the required tables in the Power BI environment.

23. How can we represent different levels of hierarchy of data in one single visualization?

- Create a hierarchy by grouping the required data from the data tab and pull that into Axis Tab and enable drill down option by clicking on the down arrow on the chart.
- Pull all the hierarchical columns separately into the axis pane in the order of their hierarchy and enable the drill down action by clicking on the down arrow on the chart.

24. How can one connect a SQL server in PBI?

- SQL Server database connection is available in Power BI. Steps to be followed are:
- In Power BI desktop go to the Get Data option in Home. Under Get Data, we have SQL Server as an option, or when you click on More - you can select SQL Server database from the list.
- When we click on Connect- it asks us to provide a few basic details related to the connection. Server info, Database info (optional), Data connectivity mode (either a direct query or an import mode).

- Once the above information is furnished, we can click on OK to connect.
- In case you need to write a specific query to load the data, you can do so under Advanced options.
- If you click on OK, a window opens which asks us for the credentials for the login to the database. We have the option to provide the specific credentials or use Windows login. It depends on how you have been given access to the database. Current credentials refer to your windows credentials. Alternate refers to Specific to the database.
- Once access is verified, you'll get a window with all the databases on the server shown in the left and right pane showing preview of the data from any table selected on the left.
- Once you select the table to use, you can see three options at the bottom – load, edit and cancel. Load will directly load the data. Edit will open Power Query Editor and will allow you to do transformations in the data before loading.
- Once data is loaded, you can use it to create visuals as per your choice.

25. What is embedded PBI?

Power BI Embedded is an analytics solution, provided as a Microsoft Azure Service, a platform-as-a-service (PaaS), wherein the developers & Individual Software Vendors (ISVs) can easily embed their dashboards, visuals & reports into an application for their customers. Fully interactive reports & visuals can be embedded into the applications.

The great thing about Power BI Embedded is that your customers are not required to have knowledge about Power BI.

Power BI gives you the capability to create an embedded application using two different methods. The first method is using a Power BI Pro account & the second method is using the service principle.

The Power BI Pro account acts as the master account of your application. This account will help you generate the required embed tokens for providing access to your customers to view the shared Power BI dashboards and reports.

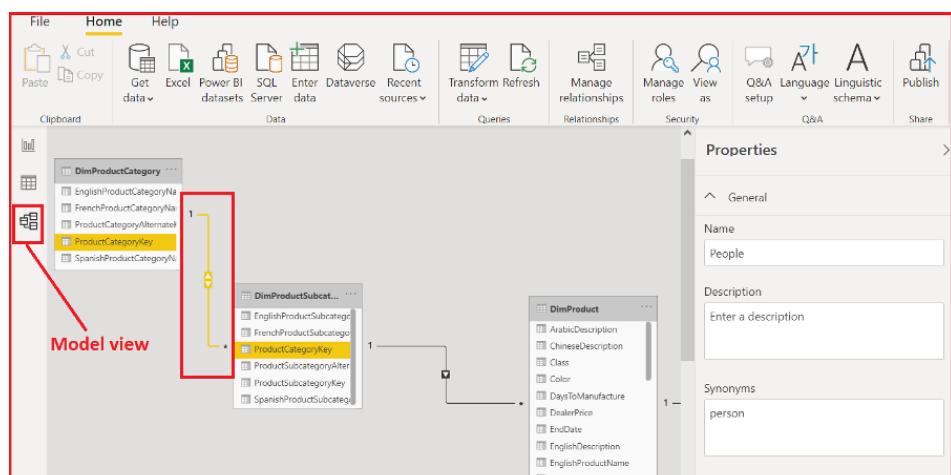
Service principal embeds Power BI Dashboards / Reports / Visuals into an application using an app-only token. This will allow you to generate the embed tokens for providing access to your shared application's Power BI dashboards and reports.

26. What are the different relationships in PBI?

There are basically 4 types of relationships in any database design. Out of which, three types of relationships are supported by Power BI.

- One to One Relationship: In this type of relationship, both side tables can have unique values. This relationship is not too common.
- One to Many: In one-to-many cardinality, one side of the table will have the unique values but the other (many) side of the table can have multiple values in it. For example, Product table & Customer Table, you can connect /join them with the Product ID. Customer table can have multiple customer IDs for the same Product ID. When you relate them from product table to customer table, it will be one-to-many relationships.

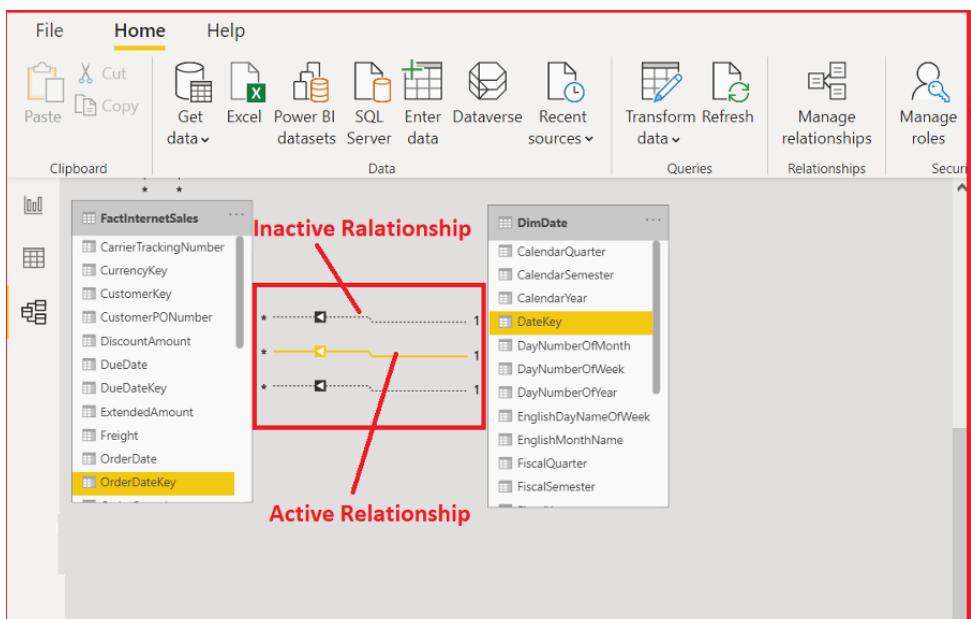
You can see the status of the relationships in the Power BI Desktop's Model view, by just looking at the indicators as (1 or *), on either side.

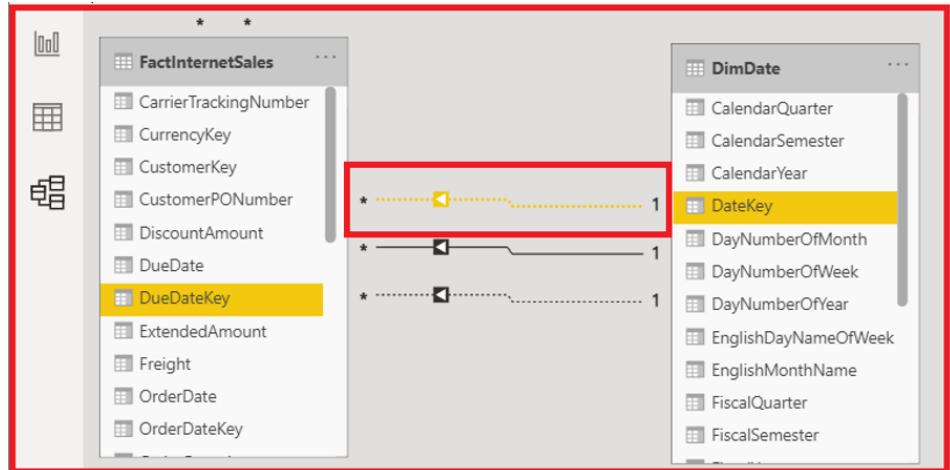


- Many to One Relationship: In this type of relationship, one side of the common column will have multiple values & in the other table it will have a unique value. For example, in the below shown images there are two tables: Fact table Sales & Dimension table Date. Date can have only the unique values but sales table, order date, key column can have multiple values for a particular date.

Cardinality is not supported by Power BI.

In Power BI, we can have many relationships in between the tables, but only one relationship active at a time. Further, we also see the relationship status of a particular relation in the Power BI model view, active relation is a straight line, whereas, an inactive relation will be a dotted Line. For further understanding, please refer to the images shown below:





27. Explain the difference between merge and append.

- Append

Append refers to the results of two (or more) queries (which are tables themselves) being combined into one query in this way:

- Rows will be appended after each other (for example, appending a query with 50 rows with another query with 100 rows, will return a result set of 150 rows)
- Columns will be the same number of columns for each query*. (for example, col1, col2,..., col10 in the first query, after appending with same columns in the second query will result into one query with a single set of col1,col2, ..., col10)

- Merge

Merge is another method of combining queries which is based on matching rows, rather than columns. The output of merge will be a single query with:

- There should be joining or matching criteria between two queries (for example, StudentID column of both queries to be matched with each other)
- Number of rows will be dependent on matching criteria between queries
- Number of columns will be dependent on what columns are selected in the result set (Merge will create a structured column as a result).

28. What are visualizations in PBI?

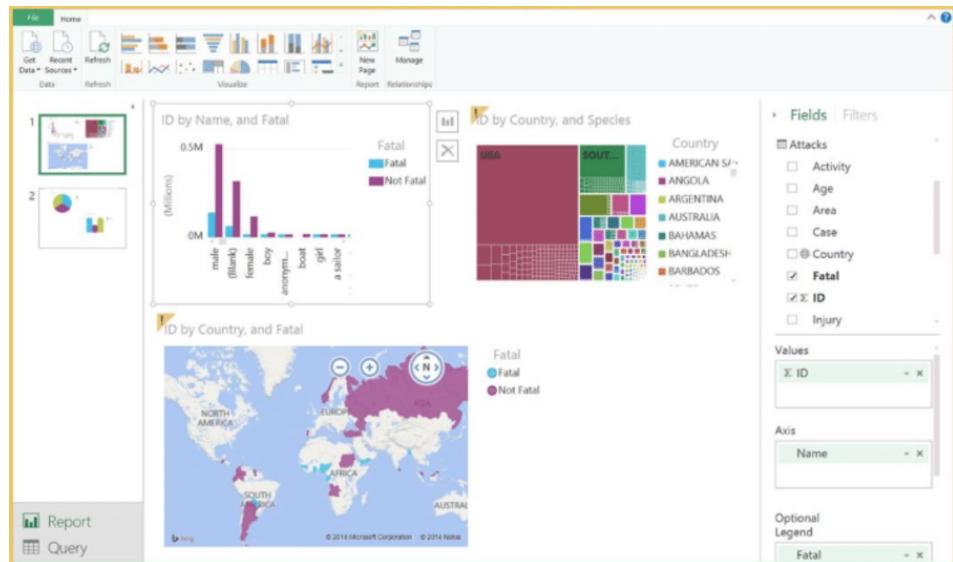
Visualizations are used to represent our data in more than a tabular form. In Power BI, we have the design space with all the elements of a report, different visuals, slicers/filters, etc. These elements, when put into the design space, are called tiles. All the visuals that are available in Power BI are put under the Visualization Pane. It includes basic visuals such as bar, pie, line, column, and map with their varieties. We have a lot of custom visuals available as well. They can be imported into the report from App Marketplace, and then we can bring them into our design view.

If one knows R or Python, then we also have the option to create visuals using code.

29. What is Power BI Designer?

A powerful and flexible new tool under the Power BI umbrella, Power BI Designer empowers users to create intuitive reports and dashboards, easily and quickly. It also lets the users change visual views of their data for better analytics and informed decision-making.

This designer is a host of drag-and-drop capabilities that help users place content exactly where they want it on the report canvas in a well-structured layout.



30. What is PBI service?

Power BI service is a secure Microsoft hosted cloud service that lets users view dashboards, reports, and Power BI apps using a web browser or via mobile apps for Windows, iOS, and Android.

31. Explain the difference between Power BI pro and Power BI premium.

With Power BI Pro, users are licensed individually and participate fully in the use of Power BI – both the creation of content and the consumption. All Pro users can connect to hundreds of data sources on-premises and in the cloud, create interactive reports and 360-degree dashboards, share that content with other Pro users, and consume content shared by others.

With Power BI Premium, you are licensing capacity for your content rather than licensing all users of that content. Content is stored in Premium and can then be viewed by as many users as you want, without additional per-user costs. These users can only view content, not create it. Viewing includes looking at dashboards and reports on the web, in mobile apps, or embedded in your organization's portals or apps. The creators of content in Premium still need their own Pro licenses.

	Power BI Pro	Power BI Premium
Licensing differences		
Included with Microsoft Office 365 Enterprise E5	●	\$  Power BI Premium can be added to any Power BI Pro deployment
Licensed per user	●	
Licensed by dedicated cloud compute and storage resources		●
Deployment and administration		
On-premises reporting through Power BI Report Server		●
Compute processing environment	Shared	Dedicated
Deploy Power BI content to multiple regions		●
Incremental data refresh		●
Publish reports to be shared	●	
Widespread distribution of content without requiring a Power BI Pro license for content consumers		●
Publish and consume paginated reports in Power BI 		●
Allocate compute resources		●
Monitor performance of dedicated compute and memory resources		●
Maximum size of individual data set	1 GB	10 GB
Maximum storage	10 GB per user	100 TB
Maximum number of automatic refreshes per day	8	48

32. What is z-order in Power BI?

The z-order in Power BI refers to the strategy or order of arrangement of different elements on a Power BI report. The z-order helps us in properly arranging all the elements in a report such as visualizations, tables, slicers, etc. The Arrange option in Power BI helps us arrange or place report elements in z-order. Using that option, we can bring objects on front, send them to back, and layer the visualizations, according to our need. So, in a nutshell, z-order is the order of arranging or layering multiple objects and visual elements in a report on top of each other. Z-order is also applied when we are using shapes to enhance the design of a report.

33. Explain the custom visuals in Power BI:

How can they be used efficiently?

Graphs or visuals which are not included in Power BI desktop are imported for better visualization. Such custom visuals are developed and uploaded on AppSource. This is done as community service to benefit Power BI users as they can explore new aspects of their data by using these custom visuals.

34. How can we categorize the types of users in Power BI?

There are mainly four types of users as per their purpose of usage of Power BI. These four types of users are 1. Analysts, 2. Business users, 3. IT professionals, and 4. Developers.

- **Analysts:** Analysts use Power BI to develop reports, dashboards, data models and study them to discover valuable insights in the data. Power BI offers a wide range of data sources from which an analyst can extract data, make a common dataset, clean and prepare that data to make reports and conduct analysis.
- **Business users:** The business users are the common users who study the reports and dashboards shared with them on Power BI website or mobile app. Business users remain updated with the latest information which helps in taking an important decision in time.
- **IT professionals:** The IT professionals are mainly concerned with the technical and managerial aspects like scalability, availability, and security of data. They also centrally manage all the Power BI services and users.
- **Developers:** Developers are involved in technical work. Their key roles are to create custom visuals to be used in Power BI, embedding Power BI into other applications, creating reports, etc.

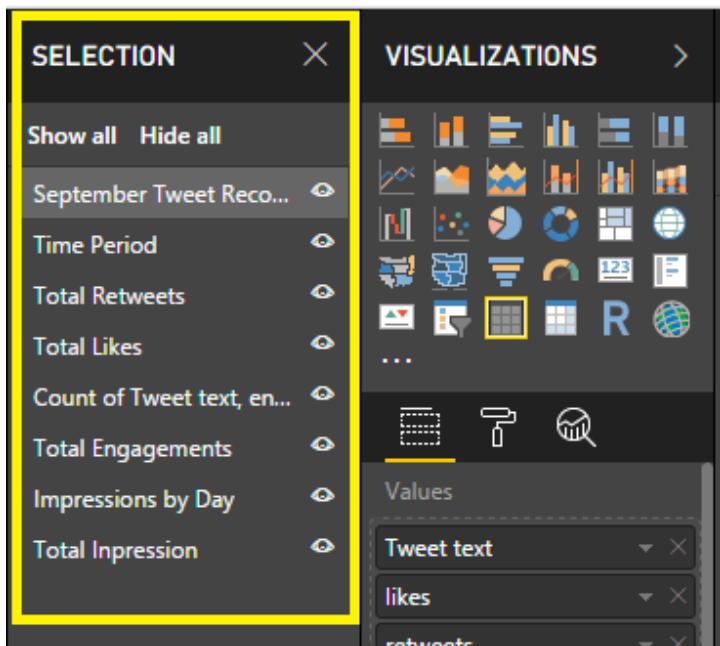
35. How can you make sure that each category manager can see sales of their category only, and allow the CEO to see all sales in a single report? Your solution must involve minimal effort.

Configuring dynamic row-level security for managers involves least effort and a separate role for the CEO ensures full accessibility to him.

Creating different reports will be a very hectic task and difficult to maintain. Slicer provides no security.

36. Why use the selection pane in PBI?

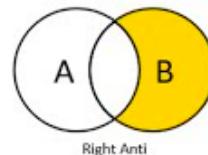
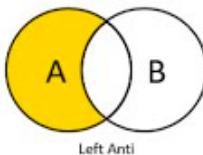
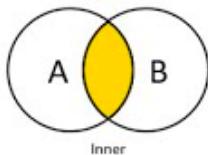
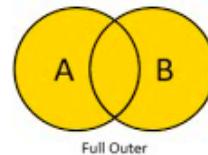
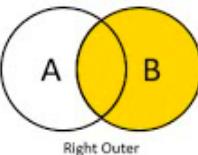
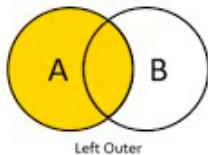
Selection Pane helps you to take control over visuals. It allows you to combine multiple visual pages in the group and is also used in bookmarking.



37. Explain the various joins in PBI.

We have 6 types of Joins in Power BI which we use in Power Query Editor:

- Left Outer Join: If we want all the records from left table and only matching records from right table then will use left outer join/left join.
- Right Outer Join: If we want to display all the records from right table and only matching records from left table then will right outer join/right join.
- Full Outer Join: If we want to display all the records from both the tables then will use full outer join.
- Inner Join: If we want only the matching records from both the tables then will use Inner join/Simple join.
- Left Anti: Displays only the mismatched records from Left Table.
- Right Anti: Displays only the mismatched records from the Right Table.



38. What is the purpose of the ‘Get Data’ icon in Power BI?

When users click on the Get Data icon in Power BI, a drop-down menu appears and it shows all data sources from which data can be ingested. Data can be directly ingested from any source including files in Excel, CSV, XML, JSON, PDF, and SharePoint formats and databases such as SQL, Access, SQL Server Analysis Services, Oracle, IBM, MySQL, and much more. Also, Power BI datasets and Power BI data flows are compatible. Data can also be taken in from Azure and other online sources.

39. Name different filters used in Power BI and explain each of them.

Power BI provides a variety of options to filter reports, data and visualizations. The following are the list of filter types:

- Visual-level Filters: These filters work on only an individual visualization, reducing the amount of data that the visualization can see. Moreover, visual-level filters can filter both data and calculations.
- Page-level Filters: These filters work at the report-page level. Different pages in the same report can have different page-level filters.
- Report-level Filters: These filters work on the entire report, filtering all pages and visualizations included in the report.

40. What is grouping? How we can use it?

Power BI Desktop allows you to group the data into small chunks. For grouping, you should use Ctrl + click to select multiple elements in the visual. Right-click one of those elements which appear in the groups window.

41. How are slicers used?

Slicers in Power BI are the simple forms of filters that play a key role in designing customized charts and reports on the Power BI Desktop. These slicers play the most crucial role in creating comparative charts or customized reports. Also, Power BI Slicers act as an alternative solution in filtering the narrow portions of datasets that are represented in the form of other visualizations in a particular report.

42. What are KPIs in PBI?

KPI stands for Key Performance Indicator. These are specific measures or calculations which provide us with insights into our data and help us make decisions based on them. These are the parameters on which business decisions are made. Power BI has a visual called KPI, which helps to visualize these specific measures. This KPI visual shows the trend of the specific measure/calculation across time (year/month) and shows how it has changed.

43. What is PBI Q&A?

The Q&A feature in Power BI allows you to explore your data using intuitive, natural language capabilities in your own words & ask questions about your data. The quickest possible way to get an answer to the question asked about your data is using natural language.

Q & A recognizes the words you type & figures out where to find the answer from. For example, you can ask questions like, “what was the total profit last year?”

You can use this feature once your Data Modelling is done, reports are built, and you have deployed it into the Power BI service.

The screenshot shows the Power BI Q&A interface. At the top, there's a navigation bar with the Power BI logo, a user icon, and the text "My Workspace > Q&A-SQLImport". On the left, a sidebar lists various datasets and dashboards. In the center, a search bar is highlighted with a red border and contains the placeholder text "Ask a question about your data". Below the search bar, a table displays data with columns "ID" and "amount". The table has 7 rows numbered 1 to 6, and a final row labeled "Total" with the value "247".

ID	amount
1	12
2	23
3	32
4	50
5	60
6	70
Total	247

44. How can we create calculated columns in PBI?

Calculated columns are built to extend the data attributes. They are columns that are created when the available columns in the data do not serve our purpose or we are not able to generate any useful insight from the same. That is when calculated columns come into the picture. These are created using different DAX functions as per business need.

We can have a simple example of a date where we do not want to work with the complete date but rather with the individual day, month, or year. For this, in the data part of the Power BI desktop, we have the option of a ‘New Column.’ When we click that, we get a formula bar on top (like excel), where it asks us to type the new column name with its calculation.

So, if we consider the date example, it will be something like this: `yearcol = YEAR([Date column])` where `YEAR` is a DAX function, and ‘`yearcol`’ is your calculated column.

45. What are combination charts in PBI?

Combination charts are charts supported by Power BI which can plot various measures over a single chart. These charts plot all the measure values. Any requirements of different measures can be plotted using combination charts. Stacked column charts and line charts are the widely used combination chart types in PBI.

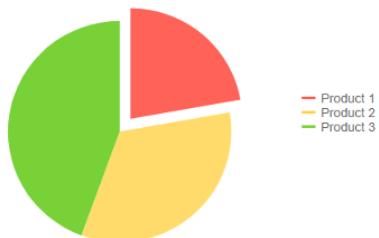
46. Explain security level in PBI.

Power BI requires Azure Active Directory (Azure AD) access for every user who uses the PBI service. User requires login credentials to build the PBI account, which could be also an email account. User also needs a unique username to access this account. Azure cloud provides security to Power BI. It includes various level of security that are ADD based security, multi-tenant platform security, and networking security.

47. Describe all types of visuals segments with examples.

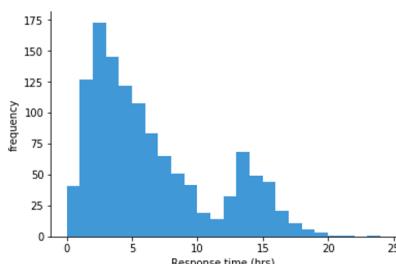
(e.g. this Pie chart shows us how the revenue is composed of different Products)

Revenue per product



- Distribution segment – Histogram, KDE Plots

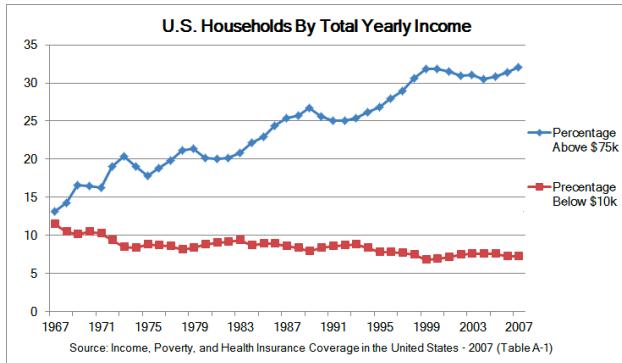
The Distribution chart tells us about the approximate representation of distribution of numerical data (Univariate data). Let's look at this Histogram showing the distribution of response time (in hrs) of a medicine. Distribution is bi-modal. This type of distribution helps us to find outliers and skewness of a variable.



- Trend Segment – Line charts

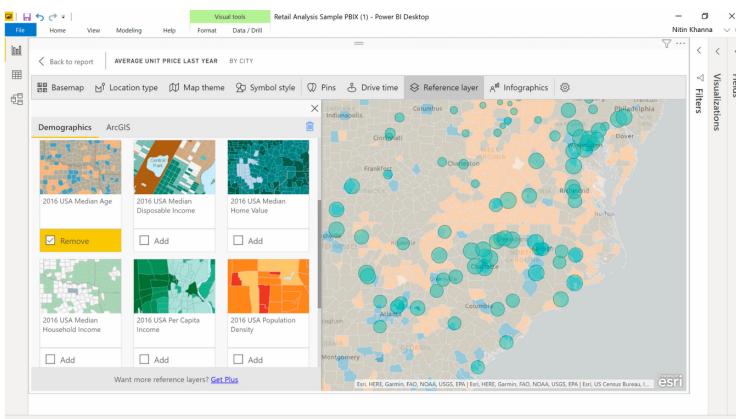
The charts in this segment tells us about the change of a variable over time.

These are widely used in Time-Series analysis.



- Maps – ArcGis graph, Chloropleth map.

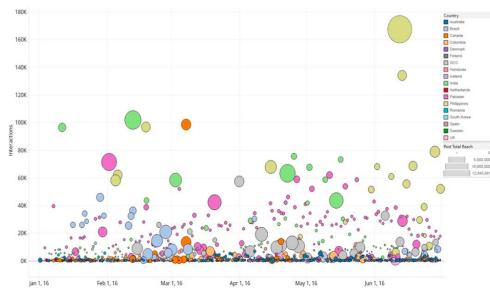
These are Geographical graphs used for variables containing actual locations. These graphs are helpful as they are more interactive than, for example, a bar graph or slicer when analyzing a quantity by region. Note: Using these graphs in Power BI will require an Internet connection.



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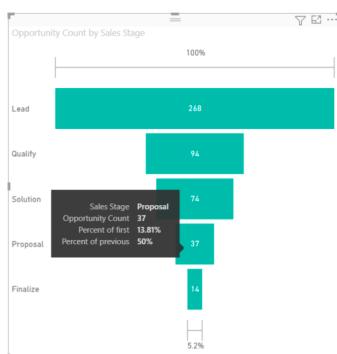
- Relation – Scatter Plot, Bubble Chart

These charts tell us the relation between two/three variables: whether they are positively related (one increases with other & one decreases with other) or negatively related (one decreases while the other increases and vice-versa) or not related (no relation, both are independent). We can find out a lot about distributions (Bi-Variate), outliers and discover clusters if any exist.



- Comparison – Bar graph, Funnel charts etc

These are helpful and widely used for comparing values because of their high interpretability. For example – if we want to compare Top N customers by the amount they spend on our products.



48. What are the advantages of using variables?

The advantages are:

- Reusability: By declaring and evaluating a variable, the variable can be reused multiple times in a DAX expression, thus avoiding additional queries of the source database.
- Interpretability: Variables can make DAX expressions more intuitive/logical to interpret.
- Scope-of-Variables: Variables are only scoped to their measure or query, they cannot be shared among measures, queries or be defined at the model level.

49. Can SQL be used in Power Query Editor?

Yes, a SQL statement can be defined as the source of a Power Query/M function for additional processing/logic. This would be a good practice to ensure that an efficient database query is passed to the source and avoid unnecessary processing and complexity by the client machine and M function. It is also used in Query Folding for optimization.

50. Consider functions like SUM,SUMX and AVERAGE,AVERAGEX. What is this X implying?

The X tells us that the function works in a row context. Absence of this X tells that the agg func works in a column context. Also, we can enter an expression to be evaluated on which the aggregation will be performed, simple SUM & AVERAGE don't provide it and just return a scalar value after aggregating the whole column.

51. Why should we use Calculated measures over Calculated columns whenever possible?

Calculated Columns are DAX expressions that are computed during the model's processing/refresh process for each row of the given column and can be used like any other column in the model.

Calculated columns are not compressed and thus consume more memory and result in reduced query performance. They can also reduce processing /refresh performance if applied on large fact tables and can make a model more difficult to maintain /support given that the calculated column is not present in the source system.

Calculated measures are DAX expressions which are calculated on the fly, that is, calculated when needed. The greatest advantage is that measure value is not stored in the memory. The measure will not consume Memory or RAM at all but it is calculated by the CPU. Measures are not pre-calculated either, they are calculated when needed.

52. State the difference between the COUNT and COUNTD Function.

COUNT Function will count all values except NULL/BLANK values, whereas COUNTD will count all DISTINCT values except for NULL/BLANK values.

53. In DAX functions like VAR.S & VAR.P, what are the P&S implying?

The P implies that the value (variance) is being calculated for the whole population whereas S implies that the value is being calculated for a sample.

54. What is a Bookmark? How do you create it?

Bookmark in Power BI helps you to capture the configured view of a report page at a specific time, including filters and states of visuals.

To create it: while on a Report Page --> Click on View Tab --> Click on Bookmarks --> Click on Add (if the current page that you are on is the one you want to create a bookmark for, think of it like a screenshot)

55. Give an example of a visual from Power BI which serves as a Cross-Table.

Matrix visual from Visualization pane in Power BI Desktop can serve as a Cross-Table and not normal Table visual as Cross-Tables can be multi-dimensional and expanding and collapsing components of columns are available in a Matrix visual only.

56. How can one create Hierarchies in Power BI?

When you have a set of fields that is on hierarchy, for example: Product Category and Product names, you can set up hierarchy by dragging the product name over the product category so that a new hierarchy field is created where we can drill down the data and see the detailed data. For instance, if you have a list of countries and cities you can create hierarchy as follows: In the fields pane drag city field onto country field the hierarchy will be created.

57. State two ways to navigate in Reports.

- Create Buttons and set action to Bookmarks
- Create Buttons and set action to Page Navigation

58. How can one import/scrape data from the web using Power BI?

- Go to Get Data option which is present in the Home Ribbon tab on Power BI Desktop and then select web option.
- Copy and paste the URL in the web dialog box and then click ok.
- After that, the connection is established to the particular URL, and the Power BI navigator dialog box shows the catalogue of the tables on the page.
- Finally, select the Results in the Navigator page and then click edit. Now, the preview of the tables will be opened in the Power BI query editor in which we can analyze and transform the data from a web page.

59. Suppose you notice that there is a relationship between the Date column from a Date table and the Invoice Date Key column from a Sales table, but the relationship is inactive. All other visuals in your report will be analyzing values by delivery date. How should you approach this problem? Give reasoning for your approach.

Using a measure:

Quantity by Invoice Date = CALCULATE (SUM (Sale[Quantity]), USERELATIONSHIP ('Date'[Date], Sale[Invoice Date Key]))

No change or deleting of existing relationships as other visuals in the report rely on that.

Hence using DAX measure will activate relationships when needed at the query time and involves least effort.

60. What is the difference between Histograms and Bar charts?

- Visual difference – Histograms appear vertically stacked whereas Bars are separated.
- Intuitive difference – Histograms study distributions whereas Bar charts are used in making comparisons. Histograms show distribution of non-discrete variables/continuous variables (quantitative data) whereas Bar graphs show comparison of discrete variables (categorical data)
- Bars can be re-ordered in Bar graphs but not in histograms.

61. How can one create filters in Power BI?

Filters are an integral part of Power BI reports. They are used to slice and dice the data as per the dimensions we want. Filters are created in a couple of ways.

- Using slicers – Slicer is a visual under Visualization Pane. This can be added to the design view to filter our reports. When a slicer is added to the design view, it requires a field to be added to it. For example, Slicer can be added for Country fields, then the data can be filtered based on countries.
- Using Filter Pane – The Power BI team has added a filter pane to the reports, which is a single space where we can add different fields as filters. These fields can be added depending on whether you want to filter only one visual (Visual level filter), all the visuals in the report page (Page level filters), or applicable to all the pages of the report (report level filters).

62. How can one sort data in Power BI?

Sorting is available in multiple formats. In data view, there is a common sorting option of alphabetical order. Apart from that, we have the option of Sort by column, where one can sort a column based on another column. The sorting option is available in visuals as well. Sort by ascending and descending option by the fields and measures present in the visual is also available.

63. What are the differences between MSBI and PBI?

MSBI	Power BI
MSBI is Microsoft Business Intelligence	Microsoft Power BI
It is a consolidated product which helps in doing ETL processing	Power BI is mainly a Business Intelligence tool with very limited ETL processing capability
It has three components – SSIS (Integration), SSAS(analytical reports), SSRS(server-based reporting)	Power BI has – Power BI desktop, Power BI Service and Power BI Mobile
MSBI must be installed locally to be able to work	Power BI is cloud based. We can develop reports directly in Power BI service i.e. in cloud workspace. No need for a local deployment.
It has complex interface and difficult to learn	It has a simple interface and is easy to learn as it is based on excel and Power Pivots.
Can handle only structured and semi-structured data	Can handle structured, semi-structured and unstructured data as well
Natural Language Query not available	Natural language query available
Can handle large data sets	In case of large data sets, direct query needs to be used to build reports.

64. How can one publish a dashboard in Power BI?

To publish a dashboard, first, we need to be signed in to Power BI using our professional account; it only takes the work/ org account. Once you are signed in, there is a publish option available. Clicking on it opens a small window- which asks you to select the workspace into which you want to publish your report. If any workspace is there to which you have been provided access, you can choose that depending on data security, or otherwise, by default, you have the option of My Workspace (which is the default space provided for you) and you can publish your report there.

65. How can PBI dashboards be shared?

Power BI reports/dashboards can be shared in multiple ways. If you and your end-users have a Power BI Pro license, then-

- You can use the share option in reports and dashboards. This option enables access to a report or dashboard to individual users.
- Using content packs – Publish your report/dashboard along with the data set as a content pack and then share it to either a group or individual or open it for the entire organization.
- Publish your dashboards and reports into App Workspace and share the App link to a group or individual or open it for the entire organization. When publishing as App, we can select the reports and datasets that we want to be included in the App.
- The report can be embedded into Web or SharePoint, for which we need the embed code. This embed code is added to the website code or the SharePoint code.

Another way to share the reports is by printing or exporting the report as PPT or PDF. This option allows the sharing of the reports, but it will not be interactive.

66. What is MDX in Power BI?

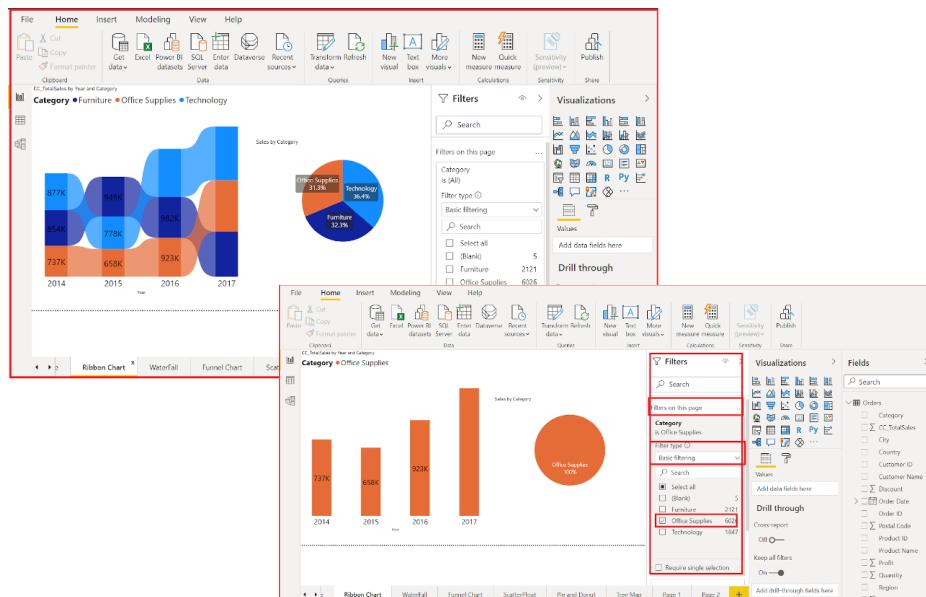
MDX is an Analysis Services Tabular capability that is used to help improve the user experience in Excel and various other applications that use MDX query language against the tabular form of the models and Power BI datasets.

67. How can one add Page Level Filters in Power BI?

The Power BI Page Level Filters are useful to filter the charts (or visuals) present on the page. For example, if your page contains four charts, then you can use this page level filter to filter those four reports at a time.

To demonstrate the Page Level Filters in Power BI:

- Go to the Filters section; you need to use the Page Level Filters section to create a filter at the page level.
- You can drag and drop any column. For example, we have taken Category from the fields section to the “Filter on this Page” area in the Filters Pane to create Page Level Filters.
- Expand the Category to view the filter types. By default, the Basic Filtering option is selected as the Filter type. We can select any Column to Filter the data with.



68. How can two columns be combined in Power BI?

To combine two columns in Power BI, you need to select a new calculated column using the DAX expression.

For example, if you need to add the values of two columns & make the third column, then you can do it by the following DAX Expression:

Total=Sheet Name(Col1) + Sheet Name(Col2).

In the image below, two text columns City & State, are added & concatenated to one new column. In the same way, you can add Numeric columns using DAX.

The screenshot shows the Power BI Data View interface. A calculated column named "City & State" is being defined with the formula: `=CONCATENATE([Orders[City]],",", [Orders[State]])`. The preview pane on the right displays the resulting concatenated values for each row, such as "Los Angeles, California".

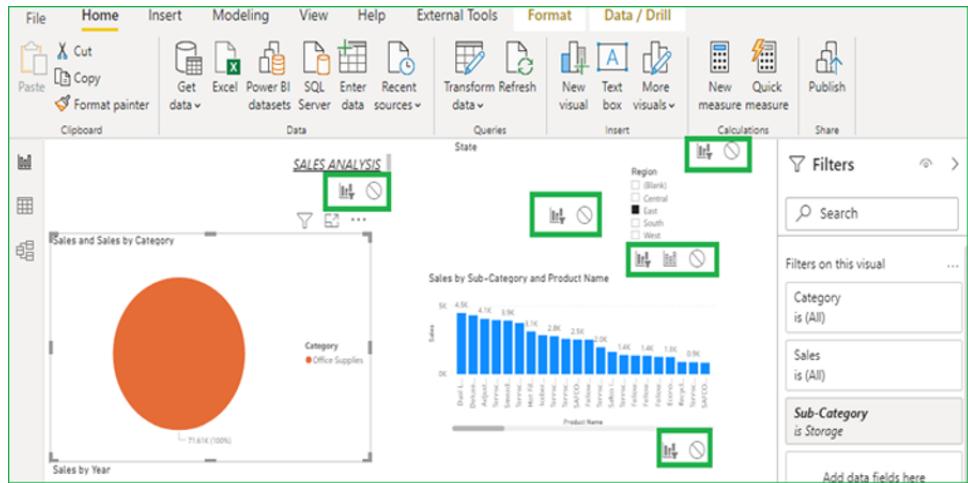
ID	Category	Sub-Category	Product Name	Sales	Quantity	Discount	Profit	CC_TotalSales	City & State
0003479	Office Supplies	Storage	Eldon Base for stackable storage shelf, platinum	77.88	2	0	3,893,999,999,999,999	155.76	Los Angeles, California
0003811	Office Supplies	Art	Newell 327	6.63	3	0	1,7901	19.89	Los Angeles, California
0001748	Office Supplies	Art	Newell 317	5.88	2	0	1,7052	17.71	Los Angeles, California
0002049	Technology	Accessories	Plantronics Savi W720 Multi-Device Wireless Headset Syst	1265.85	3	0	556,974	3797.55	Los Angeles, California
0002975	Office Supplies	Fasteners	Staples	11.34	3	0	5,2164	34.02	Los Angeles, California
0003996	Office Supplies	Storage	Letter/Legal File Tote with Clear Snap On Lid, Black/Grey	80.3	5	0	20,878	401.5	Los Angeles, California
0001477	Office Supplies	Paper	Xerox 1952	64.74	13	0	30,4278	841.62	Los Angeles, California
0001965	Office Supplies	Storage	Tennicco Regal Shelving Units	405.64	4	0	12,1092	1622.56	Los Angeles, California
0004568	Technology	Accessories	Maxell LTD Ultrium - 800 GB	251.91	9	0	47,8829	2287.19	Los Angeles, California
0001419	Office Supplies	Art	Newell 325	12.39	3	0	3,717	37.17	Los Angeles, California
0000692	Office Supplies	Appliances	Fellowes Mighty B Compact Surge Protector	60.81	3	0	17,0268	182.42	Los Angeles, California
0001879	Furniture	Furnishings	Computer Room Manager, 14"	227.38	7	0	81,8496	1591.52	Los Angeles, California
0008675	Office Supplies	Storage	File Shuttle II and Handi-File, Black	305.01	9	0	78,2525	2745.05	Los Angeles, California
0002685	Furniture	Furnishings	Executive Impressions 13 1/2" Indoor/Outdoor Wall Clock	18.7	1	0	7,106	28.7	Los Angeles, California
0003375	Office Supplies	Art	Newell 351	13.12	4	0	3,8048	52.48	Los Angeles, California
0000657	Office Supplies	Art	Bonney & Smith InkLink Desk Highlighter, Chisel Tip, Yellow	10.75	5	0	3,5475	52.75	Los Angeles, California
0000134	Office Supplies	Fasteners	Advantus Push Pins, Aluminum Head	11.62	2	0	3,6022	23.24	Los Angeles, California
0003602	Office Supplies	Art	Quartet Omega Colored Chalk, 12/Pack	11.68	2	0	5,4896	23.36	Los Angeles, California
0004782	Office Supplies	Supplies	Elite S' Scissors	16.9	2	0	5,07	33.8	Los Angeles, California
0001591	Furniture	Furnishings	Advantus Panel Wall Certificate Holder - 8.5x11	24.4	2	0	10,248	48.8	Los Angeles, California

69. How can one change the date format in Power BI Query Editor?

Select the date column in the table, go to the “Modelling” tab. Under this tab, we have the “Date” formatting section, select the date type as a date from the drop-down list.

Category	Customer ID	Customer Name	Segment	Country	City	State	Postal Code	Region
1	RA-10001	Ruben Ausman	Corporate	United States	Los Angeles	California	90049	West
2	BN-11315	Bradley Nguyen	Consumer	United States	Los Angeles	California	90049	West
3	BN-11315	Bradley Nguyen	Consumer	United States	Los Angeles	California	90049	West
4	JG-14650	James Galang	Consumer	United States	Los Angeles	California	90049	West
5	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
6	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
7	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
8	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
9	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
10	JG-14650	Greg Guthrie	Corporate	United States	Los Angeles	California	90049	West
11	AS-10240	Alon Shoham	Consumer	United States	Los Angeles	California	90049	West
12	CC-12145	Charles Crestani	Consumer	United States	Los Angeles	California	90049	West
13	MC-18100	Mick Cribbage	Consumer	United States	Los Angeles	California	90049	West
14	MC-18100	Mick Cribbage	Consumer	United States	Los Angeles	California	90049	West
15	JL-15835	John Lee	Consumer	United States	Los Angeles	California	90049	West
16	JL-15835	John Lee	Consumer	United States	Los Angeles	California	90049	West
17	JL-15835	John Lee	Consumer	United States	Los Angeles	California	90049	West
18	GB-14530	George Bell	Corporate	United States	Los Angeles	California	90049	West
19	GB-14530	George Bell	Corporate	United States	Los Angeles	California	90049	West
20	GB-14530	George Bell	Corporate	United States	Los Angeles	California	90049	West
21	CA-2016-1138913							
22	CA-2015-12197							
23	CA-2017-12642							
24	CA-2014-110849							
25	CA-2014-110849							
26	CA-2014-110849							
27	CA-2014-110849							
28	CA-2014-110849							
29	CA-2014-110849							
30	CA-2014-110849							
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34	CA-2014-110849							
35	CA-2014-110849							
36	CA-2014-110849							
37	CA-2015-167745							
38	CA-2015-167745							
39	CA-2015-167745							
40	CA-2015-167745							
41	CA-2015-167745							
42	CA-2015-167745							
43	CA-2015-167745							
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- Filter: It is used to completely filter a visual or a tile based on the filter selection of another visual or tile.
- Highlight: It is used when we want to highlight only the related elements on the visual or tile, the non-related items can be grayed out.



71. What is the main difference between LTRIM and RTRIM?

LTRIM function helps you to remove the white space from the LEFT of the string. RTRIM helps you to remove it from the right the last index.

72. Write a DAX for dynamic security.

We can implement dynamic security through the following DAX:

`USERNAME()`, `USERPRINCIPALNAME()`

73. What is Workspace in Power BI?

Workspace in Power BI is an environment that is designed to upload content like reports, dashboards, apps, datasets, etc., to share with a group of people, colleagues, management. In one workspace, you can add various reports, dashboards, datasets, etc. and add people to view, edit or modify them through the given access.

You can also add a report to your Workspace. You need to first publish it to the Power BI Desktop using the publish button in the home tab using credentials.

When you click on the workspaces and then on your particular saved workspace, you will see your saved reports, dashboards, etc., in it, which you can share with others and export as well.

The screenshot shows the Power BI desktop application interface. On the left, there's a sidebar with navigation options: Home, Favorites, Recent, Create, Datasets, Apps, Shared with me, Learn, Workspaces (which is selected and highlighted with a red border), and My workspace (also highlighted with a red border). Below this is a 'Get data' section. The main area is titled 'My workspace' and shows a list of content items:

Name	Type	Owner	Refreshed	Next refresh
My Dashboard	Dashboard	Sopna Tiwari	—	—
Visualization_Cliers_craZef	Report	Sopna	4/28/21, 10:25:29 AM	—
Visualization_Cliers_craZef	Dataset	Sopna Tiwari	4/28/21, 10:25:39 AM	N/A

To the right, a specific dashboard is displayed. It has a title bar with 'Power BI My workspace', a search bar, and a 'Visualizations' section. The dashboard itself features a map of North America with various data points represented by green and red circles. A context menu is open over one of the green circles, listing options: Pages, Cluster Bar HORIZONTAL, Side By Side, Cluster Bar HORIZONTAL, Stacked Bar, Stacked Percentage Bar, Line with Secondary Axis, Duplicate of Line with..., Cluster Bar and Line, Ribbon Chart, Waterfall, Funnel Chart, ScatterPlot, Pie and Donut, and a 'More' option. The dashboard is labeled 'Data updated 4/28/21'.



74. How can one show Percentage in Power BI?

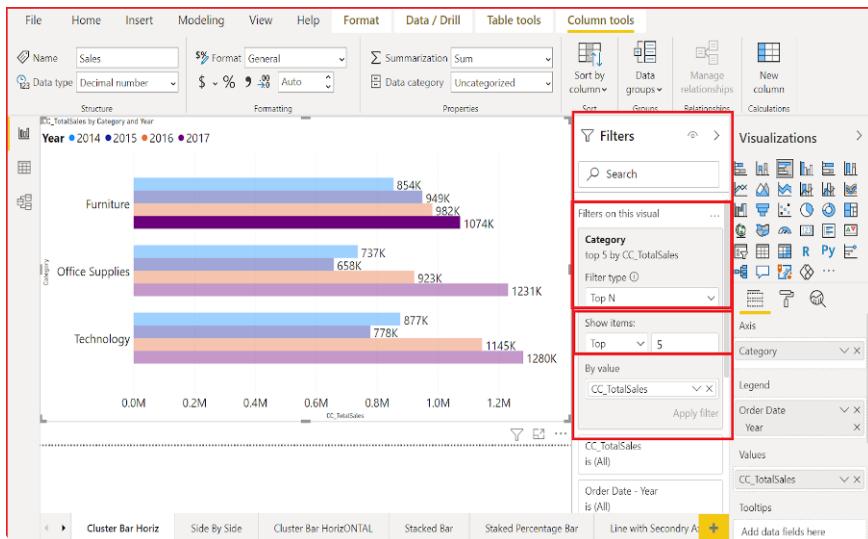
To show percentage in Power BI we can create a calculated measure / calculated column using DAX calculation and show it in the report visual depending on the requirement of the dataset being analyzed.

The screenshot shows a Power BI interface with a table visualization. The table has columns: Product ID, Category, Sub-Category, Product Name, Sales, Quantity, Discount, Profit, CC_TotalSales, and Profit %. A calculated column named 'Profit %' is defined as `=Orders[Profit]/SUM(Orders[Profit]) *100`. The table contains various rows of product data from different categories like Office Supplies, Technology, and Furniture.

Product ID	Category	Sub-Category	Product Name	Sales	Quantity	Discount	Profit	CC_TotalSales	Profit %
OFF-ST-10003479	Office Supplies	Storage	Elbow Bane for stackable storage shelf, platinum	77.88	2	0	3.893999999999999	155.76	0.00%
OFF-AR-10003813	Office Supplies	Art	Newell 327	6.63	3	0	1.7901	19.89	0.00%
OFF-AR-10001245	Office Supplies	Art	Newell 317	5.88	2	0	1.7052	11.76	0.06%
TEC-AC-10002049	Technology	Accessories	Plantronics Savi W720 Multi-Device Wireless Headset Syst	1265.85	3	0	556.974	3797.55	13.45%
OFF-FA-10002975	Office Supplies	Fasteners	Staples	11.34	3	0	5.2164	34.02	0.18%
OFF-ST-10003998	Office Supplies	Storage	Letter/Legal File Tote with Clear Snap-On Lid, Black Granite	80.3	5	0	20.878	401.5	0.73%
OFF-PA-10000477	Office Supplies	Paper	Xerox 1952	64.74	13	0	30.4278	841.62	1.06%
OFF-ST-10001963	Office Supplies	Storage	Tenensco Regal Shifting Units	405.64	4	0	12.1592	1622.56	0.42%
TEC-AC-10004568	Technology	Accessories	Maxell LTO Ultrium - 800 GB	251.91	9	0	47.8629	2267.19	1.67%
OFF-AR-10001419	Office Supplies	Art	Newell 325	12.39	3	0	3.717	37.17	0.13%
OFF-AP-10000692	Office Supplies	Appliances	Fellowes Mighty 8 Compact Surge Protector	60.81	3	0	17.0268	182.43	0.59%
FUR-FU-10001878	Furniture	Furnishings	Computer Room Ranger, 14"	227.36	7	0	81.8496	1591.52	2.86%
OFF-ST-10000675	Office Supplies	Storage	File Shuttle II and Handi-File, Black	305.01	9	0	76.2525	2745.09	2.66%
FUR-FU-10002685	Furniture	Furnishings	Executive Impressions 13-1/2" Indoor/Outdoor Wall Clock	18.7	1	0	7.106	18.7	0.25%
OFF-AB-10002375	Office Supplies	Art	Newell 331	13.12	4	0	3.8048	52.48	0.13%

75. How to filter Top N in Power BI?

Power BI provides us with a great option: to filter top N in visual data. You can go to the Filter Pane, then go to the filter on this visual & select option “Filter type” as top N & show items as top 3, 5, 10. For example, the "by value" is the amount you would prefer to filter by, let's say sales amount or profit amount. If we want to keep it dynamic, then we can create a parameter table named Top N with a measure as Top N Value that gives us the selected value. For that scenario, we can use the what-if parameter feature provided by Power BI. In the visual shown below, you can see how the Top N can be created.



76. Why is Top N not accessible by or for report level filters and page level filters?

Top N is not accessible for page-level filter and report level filter as they both are associated with different visuals.

77. What is query collapsing?

The process of converting the steps in power query editor to SQL and executing it by the source database is called query collapsing.

78. What is the difference between MAX and MAXA?

If you want to calculate numeric values, then use MAX. However, if it is for non-numeric values, then you should use MAXA.

79. What is CORR function? When do we use it?

CORR is a correlation function. It gives a correlation between two variables with a range between -1 and +1: +1 indicating positive correlation, and -1 indicating negative correlation.

80. What are content packs in Power BI?

Content packs are another way of sharing Power BI content with other users. This Power BI content will include data set, reports, and dashboards. Through content packs, we can easily control the access to reports: you have the option to keep it available for the whole organization or to a specific group of people.

One important thing to note here is that this is a Power BI Pro feature which means that you need a Pro license to create, share and consume content packs. They are created in the Power BI service and can be consumed in the same environment. We cannot use content packs on the desktop. Another thing to note is that if we get access to a content pack, it is read-only access, so we will not be able to alter any original content. If we want to work on the same data set, it gives us the option to create a copy and build our own analysis.

81. How can we use PBI in MS Excel?

To use Power BI in Excel, there is an Analyse in Excel option for every report in the Power BI service. To use it, you will need to enable editing and enable content for the report for the first time.

This option gives us the underlying data set of our Power BI report. It comes as a data connection in Excel get to play with the data in excel. It is up to us how we analyze the same data, either through pivot tables, charts, etc. By default, when the data is extracted in excel for any report, it gives a Pivot table.

82. How can we change the X-axis value in Power BI?

In Power BI, we can change the x-axis dynamically. There are a few steps we need to follow:

- Creating a separate table with the required dimension names.
- Add a slicer to the report with the field that has all the dimension names.
- Create a calculated measure that will give us the selected dimension from the slicer. We use the `SELECTEDVALUE()` function to get the value.
- Create another calculated column, which based on the value from the above measure, will select the particular column from the data.
- When creating the visual - the column created from step 4, should be dragged for the x axis and the y axis remains the same.
- Now as you will select the different field names, the x-axis will change accordingly.

83. Which two cross filter directions are available in Power BI table relationships?

When a relationship is created between two different tables in Power BI, PBI asks us for the cross-filter direction. There are two options available for cross filtering.

- Single – When cross filter direction is single, then the filtering between tables happens from left table to right table. It is the default setting. First table can be used to filter the data in the second table.
- Both – When cross filter direction is both, then the filtering between the tables will work both ways. Either table can be used to filter the other table.

84. What is Bidirectional Cross-filtering in Power BI?

Bidirectional cross-filtering in Power BI Desktop allows data modelers to determine how they want filters to flow for data using relationships between tables. With bidirectional cross-filtering, the filter context is propagated to a second related table on the other side of a table relationship. This can help data modelers solve the many-to-many problem without writing complicated DAX formulas. Thus, bidirectional cross-filtering simplifies the job for data modelers.

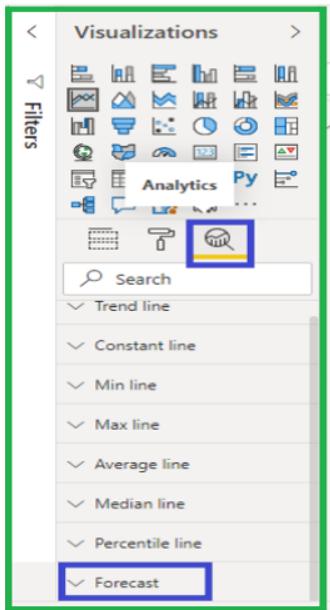
85. What is OData feed in Power BI?

OData stands for open data protocol. It helps to extract data from a URL without getting into the details of URL-specific parameters like request, response, HTTP methods, etc. It takes care of these things in the back end, leaving us to focus on pulling the data, performing transformations and conducting useful analysis.

86. What is forecast in PBI?

Forecast in Power BI helps its users to forecast data for the next period. To use the forecasting feature, we need to use the Analytics Pane. The Analytics Pane allows us to add the dynamic reference lines to the visuals we create, and provide a focus to the important trends in the data or the key insights.

You can find Forecast in the Visualizations Pane of Power BI Desktop. For Forecasting, we need to go to the Analytics Pane where we can see a Forecast option.



Just click on Add, and then set the forecast length to N months, N years, or any time period you want to forecast for, set a Confidence Interval, and then click on Apply.

87. What is Power BI Data Gateway? How can we use it?

Power BI Data Gateway is a software which is used to access the data which is connected to on-Premise network from cloud.

If you have to get connected to On-Premise data from a cloud / web-based app then it is requested through the Gateway. The access is granted through user authentication.

It does not transfer the data from the source to the client platform, it just connects the platform to on-premise data source for the direct access.

To use Data Gateway, you need to first install it in your system, proceed to add the users who will be accessing the data from on-premise sources to this, then give authentication & request to pull the data.

88. How can we refresh a PBI report once it is published on cloud?

The Power BI Reports can be refreshed through Data Gateway once they are published on cloud. If the reports are on the Power BI Site/Web, then we can use Power BI personal Gateway, whereas if the reports are published on Share-point or other cloud-based platforms etc., we can use Data Management Gateway.

89. What are the different data refresh options in PBI?

The data of the published reports can be refreshed using different ways in Power BI.

- Package Refresh: It refreshes the report by updating the data from One Drive or SharePoint. Here, the data is not refreshed through the source. Rather, it refreshes the data from the cloud location.
- Tile Refresh: In this type of Refresh, the cache data is refreshed for all the tiles in a Dashboard. Tile Refresh happens automatically after every 15 Minutes.
- Visual Container Refresh: In this type of Refresh, the cache of the entire visual container of a Report is refreshed.

90. What is Power Map? What are the primary requirements for a table to be used in Power BI?

Power Map is an Excel add-in that provides you with a powerful set of tools to help you visualize and gain insight into large sets of data that have a geo-coded component.

It can help you produce 3D visualizations by plotting upto a million data points in the form of column, heat, and bubble maps on top of a Bing map. If the data is time stamped, it can also produce interactive views that display how the data changes over space and time.

The primary requirement for the table is that it contains unique rows. Further, for data to be consumed in power map, there should be location data like:

- Latitude/ Longitude pair
- Street, City, Country/ Region, Zip Code/ Postal Code, and State/ Province, which can be geolocated by Bing

91. What are some of the differences in report authoring capabilities between a live or direct query connection to an Analysis service model, relative to working with a data model local to a Power BI Desktop file?

With a data model local to the PBIX file (or Power Pivot workbook), the author has full control over the queries, the modelling/ relationships, the metadata and the metrics.

With a live connection to an Analysis Services database, the user cannot create new metrics, import new data, change the formatting of the metrics, etc – the user can only use the visualization, analytics, and formatting available on the report canvas.

With a direct query model in Power BI to SQL Server, for example, the author has access to the same features (and limitations) available to SSAS Direct Query mode. Only one data source (one database on one server) may be used, certain DAX functions are not optimized, and the user cannot use Query Editor functions that cannot be translated into SQL statements.

92. Explain the term, ‘incremental refresh’.

Incremental refresh is newly added data that is refreshed so that there is no need to truncate or load the entire dataset.

93. You've imported a spreadsheet, but Power BI Desktop hasn't detected that the first row should be used as column titles. What tool should you click on?

Use the first row as headers.

94. What do you call a single page, also known as a canvas, that uses visualizations to tell a story?

A Power BI Service Dashboard.

95. As part of a large HR project, you are working with a dataset of company employees, both past and present. The data includes columns for EthnicGroup, PayTypeID, HireDate (the date they started work), TermDate (the date they left) and several other columns.

Goal: You want to create a new Calculated Column that determines if the person was a bad hire based on a set of rules. If they were a bad hire then the result is 1, otherwise the Calculated Column displays a zero.

The bad hire rule is:

BadHire = If the person stayed at the company less than 61 days.

Example: If a person joined the company on 27th June 2013 and left on 21st August 2013, then they would be a bad hire.

Which DAX expression would you use for this Calculated Column?

```
IF(OR(((HireDate)-[TermDate])) >= 61,ISBLANK([TermDate]),0,1)
```

96. Goal: You want to create a DAX formula that automatically calculates the previous month number. For example, if the month was June then the formula would return 5.

You have already created the DAX formula below:

Today Month = MONTH (Sales[Todays Date])

Which DAX formula would be the next right choice to achieve the goal?

Previous Month = IF (Sales[Today Month] =1,
12,Sales[Today Month]-1)

97. You have created a table with a column 'population' with numbers 53222122, 5322122, 33333. You want to display the 'population' column with comma signs at the thousand separators. How can you do this?

Go to the underlying table in DATA view, select the POPULATION column, and on the MODELING tab of the ribbon, tick the THOUSANDS SEPARATOR icon.

98. What are Data alarms?

Alerts that notify when data refreshed in dashboards is going beyond the set limits.

99. Which type of visualisation would you choose if you wanted to show relationships between 3 numerical values, and turn the horizontal axis into a logarithmic scale?

The worksheet data would include grouped sets of values and your goal is to show patterns in large sets of data (for example, by showing linear or non-linear trends, clusters, and outliers).

Bubble Chart.

100. You are viewing a Power BI dashboard in a browser window. What happens when you click the 'In-focus' mode of a tile?

The tile you selected expands and takes the full space.

101. How would you include different terms into Q&A?

In Power BI Desktop, go into the Relationships, select the table, and select Modelling and Synonyms.

102. Goal: To extract the balance for the last period for which a figure has been entered from a balances table.

What function will you use?

LASTNONBLANK

103. What are some of the unique data invigorations used for generating distributed reports within Power BI?

There are four main types of invigorating steps when it comes to Power BI.

- Visual Compartment

This type of invigorating is a visual compartment refresh stored in a report type \ once the data starts to change. In order to find out if the data invigoration worked, you can check on the accompanying connections.

- Tile Invigorate

Tile invigorate refreshes the data for the tile visuals on the dashboard once the data begins to change. This happens at regular intervals.

- Bundle Invigorate

Bundle invigorate can model or revive your data. This would then synchronize the Power BI Desktop or Excel document between the Power BI and OneDrive, or SharePoint Online. This does not pull the data from the first data source though. When the data comes to Power BI, it can refresh it once it is inside the OneDrive record.

- Display / data revive

This refers to the type of revising to the dataset inside the Power BI with data from the initial data source. This would either be finished by utilizing booked revive or invigorate now. That usually requires an entry point for the on-premises data sources, in the form of access tokens or login credentials.

104. When you share with people outside your organization, they get an email with a link to the shared dashboard. They need a Power BI Pro license, and they have to sign in to Power BI to see the dashboard. After they sign in, they see the shared dashboard in its own browser window without the left navigation pane, not in their usual Power BI portal. They have to bookmark the link to access this dashboard in the future.

What should be kept in mind while sharing the visualization outside the organization?

They can't edit any content in this dashboard or report. They can't change any filters/slicers available on the reports connected to the dashboard and save their changes.

People outside your organization can't see any data if role- or row-level security is implemented for on-premises Analysis Services tabular models.

105. A CurrentSales dataset contains a large number of product codes for items that the company have sold in the last 12 months. Due to the nature of the business and the wide variety of suppliers, the product codes come in a variety of formats, including mixed case characters.

Write a DAX expression that checks if the product code contains the letters "ex".

SEARCH("ex", [ProductCode])

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106. What type of chart should be used to compare data side by side?

Waterfall

107. What type of chart should you choose to show correlation between 2 variables?

Scatterplot.

108. What is Row-level security in Power BI?

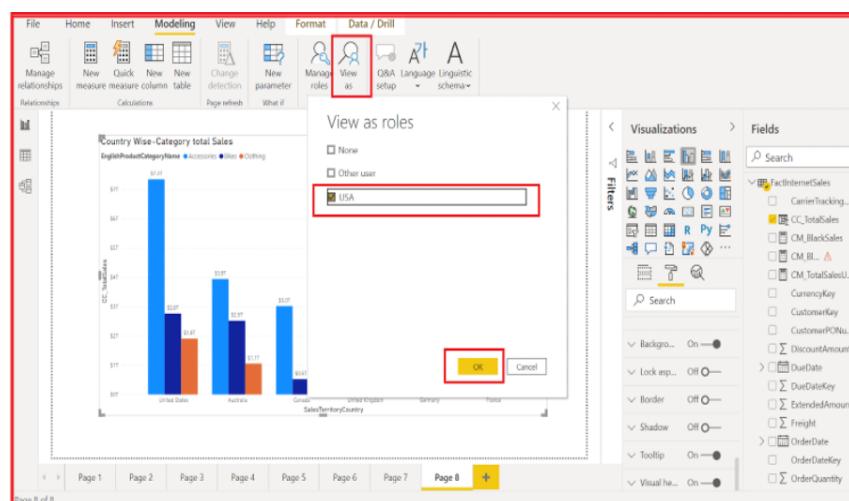
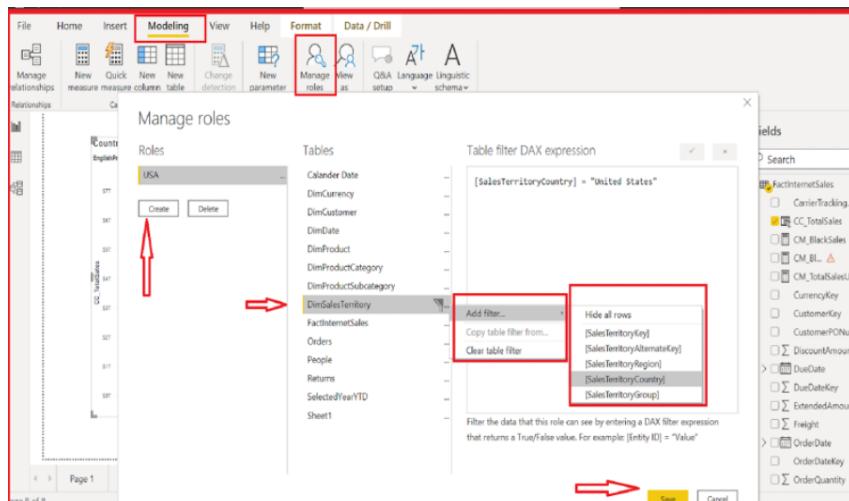
Row-level security restricts the access of certain data to the given users. Filters are used to restrict the data access at the Row level.

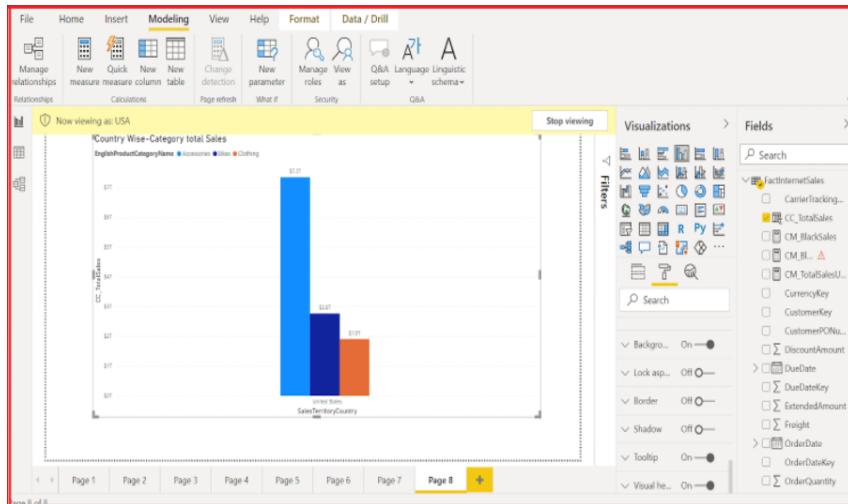
In Power BI Desktop, once you are done with the Report creation, you can define the roles & rules of your reports. These defined roles are also published to Power BI service, once the Reports are published to service. You can use the below steps to create the security roles.

- Import the data into your Power BI Desktop, if it isn't already a Direct query
- Configure a connection.
- Go to the Modelling tab, Select Manage Roles & Select Create.
- Give a name to your Role.
- Now select a table (below example is of the Sales Territory Column in the Table Dim Sales Territory) in which you want to create rules by using the DAX.
- Once the DAX is complete, click on the check box & there you go.



In the reference example below, you have the sales data of different countries and you want that a particular country should see the data related to that country only. Once you create the roles, you can view it by going to ‘View Roles’ & then you will have the data only about the Role created as Country USA.





109. What is natural language search choice?

The natural language search choice is language-based learning for communicating with information as a part of Power BI suite for Office 365 advertising.

110. State the differences between Power BI and SSRS.

Power BI:

- Power BI gives strong data manipulation features in its backend but provides access only to simple visualizations.
- In the free version, Power BI limits the use 1 GB data.
- Power BI allows several data sources supported by Tableau. With the integration of Office 365 suite, it allows connection with Share Point. Power BI also allows online support to the user for direct visualization through Search Engines but is limited to Bing search.

- There is a free version available in Power BI which allows the user to 1GB data set limit. Pro Software is paid but is cheaper in the market compared to other BI tools.
- Implementation process in Power BI is quite simple. It uses cloud storage.

SQL Server Reporting Services:

- SQL server Reporting Services is generally used to make pixel perfect reports and provides limited dashboard options.
- SSRS does not have any limit. Also, it allows users to connect larger data sets, which is not possible in Power BI.
- SSRS also allows various data sources for connections to make business intelligence reports.
- Upon request, the cost details are exposed to the user.
- This software license is available on request and is available on cloud platforms such as Azure, AWS and some other major platforms.
- Compared to Power BI, SSRS contains complex implementation processes.

III. What are the drawbacks of using Power BI?

- Dashboards and reports can only be shared with users having identical email domains.
- Power BI does not mix imported data, which is accessed from real-time connections.
- Power BI can't accept file sizes larger than 1 GB.
- Dashboard does not accept or pass user, account, or other entity parameters.

Q12. What are the differences between Power BI and Tableau?

Below are some of the major differences between Power BI and Tableau:

Power BI	Tableau
Power BI can handle a limited volume of datasets.	Can handle huge datasets without affecting the performance of the system.
Can be used by both naive and experienced users.	Used by experienced professionals for data analytics purposes.
Power BI has an easy-to-learn interface that helps the user to visualize the data and create reports.	The interface is difficult to understand by a non-technical user.
Provides an easy way for embedding the reports.	It's a real-time challenge for embedding reports in Tableau.
Power BI uses Data Analysis Expression(DAX) to build formulas and expressions for measuring the columns.	Tableau uses Multidimensional Expressions(MDX) to create complex calculations and measure columns and dimensions.



This brings our list of 110+ Power BI interview questions to an end.

We believe these series of guides will help you “expect the unexpected” and enter your first data analytics interview with confidence.

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