

Power BI – Advanced Interview Questions

(Practice Project)



Basic

1. What are the primary data sources you can connect to in Power BI?

Power BI supports a wide variety of data sources, allowing users to import and analyze data from multiple platforms. These include:

- **File sources:** Excel, CSV, XML, JSON
- **Database sources:** SQL Server, Oracle, MySQL, PostgreSQL
- **Online services:** Azure, Salesforce, Google Analytics, SharePoint Online
- **Other sources:** OData feeds, Web pages, Hadoop, Spark

This extensive connectivity ensures that Power BI can be integrated with almost any data infrastructure for comprehensive analysis.

2. What is a Power BI gateway?

A Power BI gateway acts as a bridge between Power BI cloud services and your on-premises data sources. It allows you to securely transfer data from on-premises servers (like SQL Server or a local Excel file) to Power BI Service, enabling real-time data access and refreshes. There are two main types of gateways:

- **Personal mode:** Suitable for individual use, supporting a single user.
- **Standard mode:** Suitable for organizational use, supporting multiple users and data sources.

Gateways are crucial for maintaining a secure and seamless connection between on-premises data and the cloud.

3. What is the difference between a report and a dashboard in Power BI?

Reports in Power BI are detailed multi-page documents that present data through a variety of visualizations, such as charts, tables, and maps. They offer deep insights into data, often allowing users to interact with individual visualizations to explore data trends and relationships.

Dashboards, on the other hand, are single-page summaries that aggregate visualizations from multiple reports or datasets. Dashboards are designed to provide a high-level view of key metrics and are typically used for monitoring purposes. Unlike reports, dashboards do not allow for detailed exploration within each visualization.

4. How does Power BI handle scheduling data refreshes?

Power BI allows you to schedule automatic data refreshes for datasets connected to cloud-based and on-premises data sources. For cloud-based sources, Power BI handles refreshes automatically. For on-premises sources, a gateway is required to facilitate the refresh. Users can set the frequency of refreshes—daily, weekly, or even more frequently depending on the needs—and can also manually refresh data on demand. This ensures that reports and dashboards always reflect the most current data.

5. What is role-based security in Power BI?

Role-based security in Power BI allows administrators to control access to reports and datasets based on user roles. By defining roles within Power BI, you can restrict what data different users or groups can see or interact with. For example, a “Manager” role might have access to all sales data, while a “Sales Representative” role might only access data related to their own region. This ensures that users only see the data they are authorized to view, enhancing data security and privacy.

6. How do you set up row-level security (RLS) in Power BI?

Row-level security (RLS) is used to restrict data access for users based on roles within a dataset. To set up RLS in Power BI:

1. Go to the “Modeling” tab in Power BI Desktop.
2. Click on “Manage Roles.”
3. Create a new role and define DAX filters that limit data visibility at the row level (e.g., [Region] = "West").
4. Assign users to roles through the Power BI Service.

When users access the report, they will only see the data permitted by the RLS settings. This is particularly useful for scenarios where sensitive data needs to be protected.

7. What are the key features of the Power BI mobile app?

The Power BI mobile app allows users to access and interact with Power BI reports and dashboards on their mobile devices. Key features include:

- **Mobile-optimized reports:** Ensures that visualizations are responsive and easy to view on smaller screens.
- **Push notifications:** Alerts users to data updates or important changes in key metrics.
- **Offline access:** Allows users to view cached data even when they are not connected to the internet.
- **Touch-optimized navigation:** Enables intuitive interactions, such as swipe gestures, to explore reports.

The mobile app enhances the accessibility and usability of Power BI, ensuring that insights are available anytime, anywhere.

8. What are the advantages of using bookmarks in Power BI?

Bookmarks in Power BI offer several advantages that enhance the interactivity and user experience of reports:

1. **Interactive Navigation:** Bookmarks enable the creation of interactive navigation within reports, allowing users to switch between different views or sections of a report with a single click.
2. **Storytelling and Presentations:** They allow report creators to craft a narrative by capturing specific states of a report, which can be used to guide users through a data-driven story during presentations.
3. **Custom Views and Filters:** Bookmarks can store custom views, including applied filters, slicers, and drilldowns, which can be recalled instantly to focus on specific data insights.
4. **User Personalization:** Users can personalize their experience by saving and recalling their favorite views or analysis configurations using bookmarks.
5. **Enhanced Report Interactivity:** By combining bookmarks with buttons and other interactive elements, you can create a more dynamic and engaging user interface, making the report easier to explore.

Overall, bookmarks provide a powerful tool for enhancing the interactivity, usability, and storytelling capabilities of Power BI reports.

9. What is the purpose of data profiling in Power BI?

Data profiling in Power BI involves analyzing the data to assess its quality and structure before further processing. In Power Query Editor, data profiling helps users:

- **Identify data types:** Check the consistency of data types across columns.
- **Detect errors:** Spot anomalies, such as missing or duplicate values.
- **Understand distributions:** Visualize the distribution of data within a column.

By profiling data, users can clean and transform data more effectively, ensuring that the final dataset used in reports and dashboards is accurate and reliable.

10. What are the advantages of custom visuals in Power BI?

Custom visuals in Power BI provide several advantages, including:

1. **Tailored Visualization:** Custom visuals allow you to create tailored visualizations that meet specific business needs or display data in unique ways that are not possible with standard visuals.
2. **Enhanced Functionality:** They can offer enhanced functionality, such as interactive elements or advanced data manipulation capabilities, that go beyond the built-in Power BI visuals.
3. **Branding and Aesthetics:** Custom visuals can be designed to align with your organization's branding guidelines, ensuring consistency in the look and feel of reports and dashboards.
4. **Community and Third-Party Development:** Power BI's marketplace offers a wide range of custom visuals developed by the community and third-party vendors, providing access to innovative and specialized visualization options.
5. **Problem-Specific Solutions:** For complex data scenarios, custom visuals can address specific challenges, making it easier to interpret and analyze data that may be difficult to represent with standard visuals.

Overall, custom visuals expand the possibilities for data representation in Power BI, allowing users to create more impactful and relevant reports.

11. What are the benefits of using Power BI Service over Power BI Desktop?

Power BI Service (the cloud-based platform) offers several benefits over Power BI Desktop:

1. **Collaboration:** Allows multiple users to work on the same report and share insights across an organization.
2. **Data refreshes:** Supports scheduled data refreshes, ensuring that reports always reflect the latest data.
3. **Scalability:** Can handle larger datasets and provides integration with other Microsoft services like Azure and Office 365.
4. **Mobile access:** Users can access reports on mobile devices through the Power BI mobile app.
5. **Security:** Includes enterprise-level security features, such as role-based access control and data encryption.

While Power BI Desktop is powerful for development, Power BI Service is essential for sharing and scaling reports across an organization.

Intermediate

12. How does data profiling in Power Query help improve data quality and analysis?

Data profiling in Power Query involves analyzing the quality and structure of your data before performing transformations. It helps identify issues such as missing values, duplicates, or inconsistencies in data types. By understanding these aspects, you can make informed decisions on how to clean and transform your data, ensuring it is accurate, complete, and ready for analysis. Data profiling tools like column quality, column distribution, and column statistics provide insights that allow you to improve data integrity and enhance the overall quality of your analysis.

13. What are the different types of joins available in Power Query?

Power Query offers several types of joins, including Left Join, Right Join, Inner Join, Full Outer Join, and Anti Join. Each type determines how data from two different tables is combined:

- **Left Join:** Includes all records from the left table and matched records from the right table.
- **Right Join:** Includes all records from the right table and matched records from the left table.
- **Inner Join:** Only includes records that have matching values in both tables.
- **Full Outer Join:** Includes all records from both tables, with matched records from both sides where available.
- **Anti Join:** Includes records from one table that do not have a match in the other table.

The choice of join affects the resulting dataset by determining which rows are included and how data from different sources is aligned.

14. What are some strategies for implementing row-level security (RLS) in Power BI to protect sensitive data?

Implementing Row-Level Security (RLS) in Power BI allows you to control access to data based on user roles. Strategies include:

- **Defining Roles:** Create roles within Power BI Desktop that specify DAX filters to restrict data visibility.
- **Dynamic RLS:** Use functions like USERPRINCIPALNAME() in DAX expressions to apply filters based on the current user's identity.
- **Testing RLS:** Use the "View as Role" feature in Power BI Desktop to test and validate your RLS implementation.
- **Publishing with RLS:** Ensure that roles are correctly assigned when deploying reports to the Power BI Service, so users only see the data they are authorized to view.

15. What are the key considerations for optimizing the performance of a large Power BI report?

Optimizing a large Power BI report involves several considerations:

Data Model Optimization: Reduce the size of your data model by removing unnecessary columns and tables, using proper data types, and aggregating data where possible.

Efficient DAX Calculations: Optimize DAX formulas by minimizing complex calculations and avoiding volatile functions that recalculate frequently.

Incremental Data Refresh: Use incremental refresh to update only the new or changed data, rather than refreshing the entire dataset.

Reducing Visual Complexity: Limit the number of visuals on a report page and avoid overly complex visuals that require extensive processing.

Using Aggregations: Implement aggregations in your data model to pre-calculate summary data, reducing the load on real-time calculations.

16. How do you approach error handling in M language within Power Query, and what techniques can you use?

Error handling in M language within Power Query involves anticipating and managing potential issues that may arise during data transformation. Techniques include:

Using try and otherwise: The try expression allows you to catch errors in a query, and the otherwise clause provides an alternative action if an error occurs.

Error Values: Implement logic to replace error values with a default or calculated value to prevent the query from failing.

Data Type Conversion: Ensure that data types are converted carefully to avoid errors, especially when dealing with null values or mismatched types.

Testing Queries: Regularly test queries on different data sets to identify and resolve potential issues before they cause errors in the final report.

17. How can you leverage Power BI's features to create highly interactive and user-friendly dashboards?

Creating interactive dashboards in Power BI involves utilizing features that enhance user engagement:

Slicers and Filters: Use slicers and filters to allow users to dynamically interact with the data, refining the view based on their selections.

Drill-through and Drill-down: Enable drill-through and drill-down actions to allow users to explore data at different levels of detail, making the dashboard more informative.

Tooltips and Bookmarks: Use tooltips to provide additional context for visuals, and bookmarks to create guided navigation paths or toggle between different views.

Custom Visuals: Incorporate custom visuals to represent data in a way that is intuitive and aligns with the user's needs.

18. What is the purpose of using custom connectors in Power BI, and how do they benefit data integration?

Custom connectors in Power BI allow you to connect to data sources that are not natively supported by Power BI. The benefits of using custom connectors include:

Extending Data Access: Custom connectors enable integration with proprietary or less common data sources, expanding the range of data that can be analyzed in Power BI.

Consistency and Reusability: Once developed, custom connectors can be reused across multiple reports and projects, ensuring consistency in data access and reducing development time.

Tailored Functionality: Custom connectors can be designed to meet specific business needs, including custom authentication methods, query parameters, and data transformation processes, making data integration more efficient.

Advanced

19. Explain the concept of composite models in Power BI.

Concept: Composite models in Power BI enable the combination of data from different sources using both DirectQuery and Import modes. DirectQuery allows real-time querying of live data from sources like SQL Server, while Import mode loads data into Power BI's in-memory storage for faster access and analysis.

Benefit: This approach provides the flexibility to use real-time data where needed and import large datasets for faster performance. It allows you to build comprehensive reports that leverage both real-time and historical data effectively.

Example: Suppose you have a large dataset of historical sales in SQL Server (Import mode) and frequently updated data in a cloud-based CRM system (DirectQuery). You can create a report that combines historical trends with the latest data in real-time.

20. What is incremental data refresh, and how is it implemented in Power BI?

Concept: Incremental data refresh optimizes data updates by refreshing only the data that has changed or been added since the last refresh. This method is more efficient than refreshing the entire dataset, especially for large tables.

Implementation:

1. Configure Refresh Settings: In Power BI Desktop, go to the data model, select the table, and set up incremental refresh policies by specifying date columns and the range of historical data to keep.

2. Publish to Power BI Service: Once configured, publish the dataset to Power BI Service and schedule the refresh. Power BI will then update only the new or changed data based on your settings.

Example: If you have a dataset with monthly sales data, you can set up incremental refresh to only update the data for the past month rather than reloading the entire dataset every time.

21. How do you troubleshoot and resolve errors in DAX calculations?

Concept: DAX errors typically arise from syntax mistakes, invalid references, or logical errors in the formulas. Effective troubleshooting involves a systematic approach to identify and resolve these issues.

Steps:

- 1. Verify Syntax:** Ensure your DAX formula follows the correct syntax and uses the right functions and operators.
- 2. Check Data Types:** Make sure the data types of columns used in calculations match the expected types (e.g., numeric, date).
- 3. Review Error Messages:** Use the error messages provided by Power BI to pinpoint issues with the formula.
- 4. Isolate Issues:** Break down complex formulas into simpler components to identify which part is causing the error.

Example: If a formula to calculate total sales returns an error, check if all column names are correct, if data types match the expected input for functions, and if all necessary filters and conditions are appropriately applied.

22. How can you calculate the running total of sales over time?

Sample Data:

Date	SalesAmount
2024-01-01	100
2024-02-01	150
2024-03-01	200

Solution :

```
RunningTotalSales =
CALCULATE(
    SUM(Sales[SalesAmount]),
    FILTER(
        ALL(Sales[Date]),
        Sales[Date] <= MAX(Sales[Date])
    )
)
```

This formula calculates the cumulative total of sales up to the current date.

23. How can you calculate the sales growth rate compared to the previous period?

Sample Data:

Month	SalesAmount
Jan	100
Feb	150
Mar	200

Solution :

```
GrowthRate =
VAR PreviousMonthSales =
CALCULATE(
    SUM(Sales[SalesAmount]),
    PREVIOUSMONTH(Sales[Date])
)
RETURN
    DIVIDE(SUM(Sales[SalesAmount]) - PreviousMonthSales,
PreviousMonthSales, 0)
```

This formula calculates the percentage change in sales from the previous month.

24. How do you calculate the percentage of total sales for each record?

Sample Data:

OrderID	SalesAmount
1	100
2	150
3	200

Solution :

```
PercentageOfTotalSales =  
    DIVIDE(SUM(Sales[SalesAmount]),  
    CALCULATE(SUM(Sales[SalesAmount]), ALL(Sales)), 0)
```

This formula calculates the percentage each sales amount contributes to the total sales.