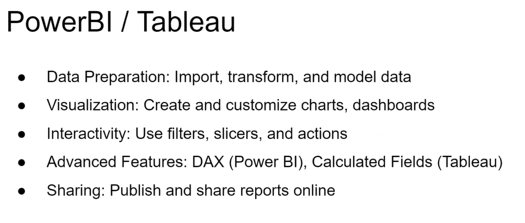
Topics



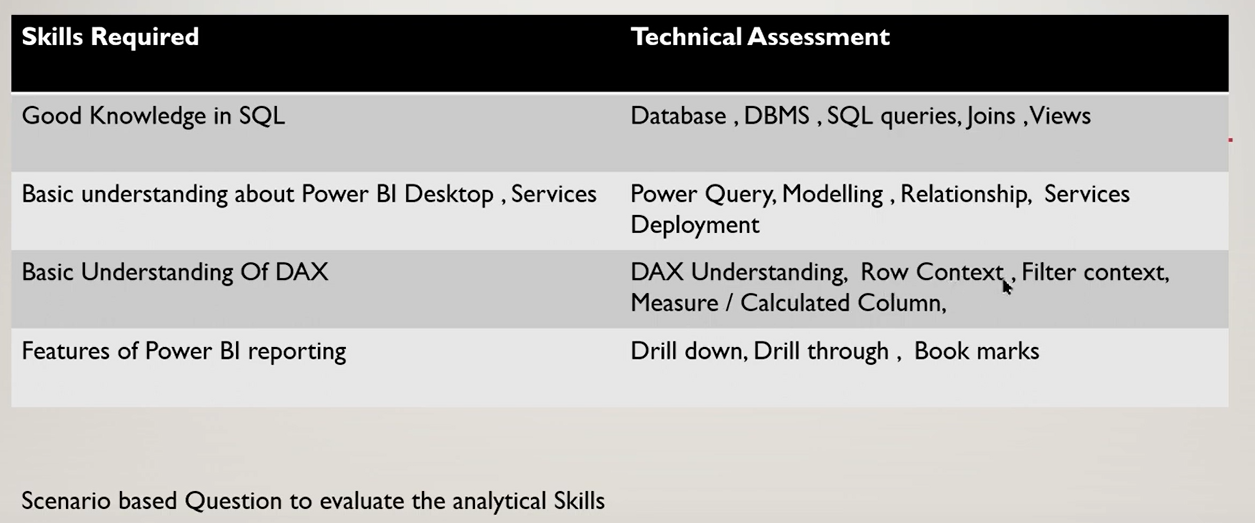
**Tableau**

**Live Connections**

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| Tableau | Live vs Extract Data Source Demo - [CodeCowboyOrg](https://www.youtube.com/@CodeCowboyOrg) – refresh rate | https://youtu.be/Yy1fh66Z6tg?si=SF40qP0InvyAsnUJ |
| Live vs Extract for Excel file import | https://www.youtube.com/watch?app=desktop&v=-SFfEPYWPP0 |
| [TABLEAU] Performance Recording on Tableau Server | https://youtu.be/aulmhZd2\_ks?si=MexHpbBNOexoRRKn |
| Connecting Tableau to SQL Server Database | Running SQL Queries | https://youtu.be/kuDgfwGTeuY?si=n\_x4Ti1rj6ZZSI64 |
| Tableau and Custom SQL - plus stored procedure, parameters and initial SQL | sqlbelle | <https://www.youtube.com/watch?v=nEjLMif5Axs> |

**Power BI**

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| 1. **Prepare Your Data**  * Identify the data sources (e.g., Excel, SQL Server, cloud services like Azure or Google Sheets). * Clean and format the data to ensure accuracy and consistency. | **Salesforce objects -** <https://youtu.be/nfmJfhUKS1M?si=MbeIEQS9BezmmzG6> |
| 2. **Connect to Data Sources**  * Open Power BI Desktop. * Use the Get Data option to connect to the desired data source. * Load or transform the data using **Power Query Editor.** | **Power Query -** <https://www.youtube.com/watch?v=UAFExySaSPY>  [**https://www.slideshare.net/slideshow/power-bi-notes/238411027#55**](https://www.slideshare.net/slideshow/power-bi-notes/238411027#55)  **read page 3** |
| 3. **Data Modeling – Power Pivot**  * Establish relationships between tables if using multiple datasets. * Create calculated columns or measures using **DAX** (Data Analysis Expressions) as needed. | **DAX -** <https://youtube.com/shorts/0FqyGnmS6os?si=Rcad2rSuFaQyV5SI> |
| 4. **Design Visualizations**  * Drag fields to the canvas to create visualizations like charts, tables, and KPIs. * Use **Filters** to narrow down data views as required.   Add slicers for interactivity and drill-down options for detailed analysis. | Drill down - [How to use Drill Down in Power BI | Microsoft Power BI for Beginners - YouTube](https://www.youtube.com/watch?v=ulFY20KTzFQ)  [Filters vs Slicers in Power BI Tutorial (39/50)](https://www.youtube.com/watch?v=d2Z0qIky-Cw)  KPI visual- https://www.youtube.com/watch?v=ehznTSeLdMU&t=133s |
| 5. **Customize the Report**  * Format visuals for consistency (e.g., color themes, labels, titles). * Add **Text Boxes** or images for context and branding. * Create multiple pages if necessary for complex reports. |  |
| 6. **Add Interactivity**  * Use features like tooltips, bookmarks, and slicers to make the report interactive. * Test interactivity to ensure it works as intended. | Drill though - [6.8 How to Use Drillthrough in Power BI | Power BI Tutorial for Beginners | By Pavan Lalwani - YouTube](https://www.youtube.com/watch?v=k-uWcjbLv0E)  **Custom tooltips -** <https://youtube.com/shorts/e7-fepQdTMY?si=nRmvRVj6jPWxwMVj>  Bookmarks - <https://youtu.be/_HTF7Ph7Eqc?si=A_W7wQkocBApadkx> |
| 7. **Save and Publish**  * Save the report as a .pbix file. * Click on the **Publish** button in Power BI Desktop. * Log in to your Power BI Service account. | 8. **Publish to Power BI Service**  * Choose a workspace in Power BI Service to publish the report. * Upload the .pbix file if you skipped the direct publish step. |
| 9. **Share the Report**  * Use **Manage Permissions** to control access to the report. * Share links or embed the report into applications like Teams or SharePoint. * Set up automatic refresh schedules if using live or updated data. | 10. **Monitor and Update**  * Monitor usage metrics to evaluate report performance. * Update the report as needed based on feedback or new data requirements. |
| 11. **Implement Row Level Security**  * Navigate to **Modeling > Manage Roles** in Power BI Desktop. * Create a role and apply filters on tables using DAX expressions (e.g., [Region] = "North"). * Use **View as Role** in Power BI Desktop to test the role functionality. * Publish the report to Power BI Service and assign users or groups to roles under **Security** in the dataset settings. | Parent child hierarchy - <https://www.youtube.com/watch?v=61fUUciDnks> |
| 11. Power BI services and Licenses  * Power BI Reporting Server * Power BI Service Desktop * Power BI Mobile * Power BI Embedded |  |
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https://youtu.be/Om\_DqqvZWOM?si=AnH\_wippJghez\_OG

* Sample project work
* Filters / slicers, actions

Case Studies

### **Advanced Power BI Technical Interview Questions and Answers**

### **1. How do you optimize Power BI performance for large datasets?**

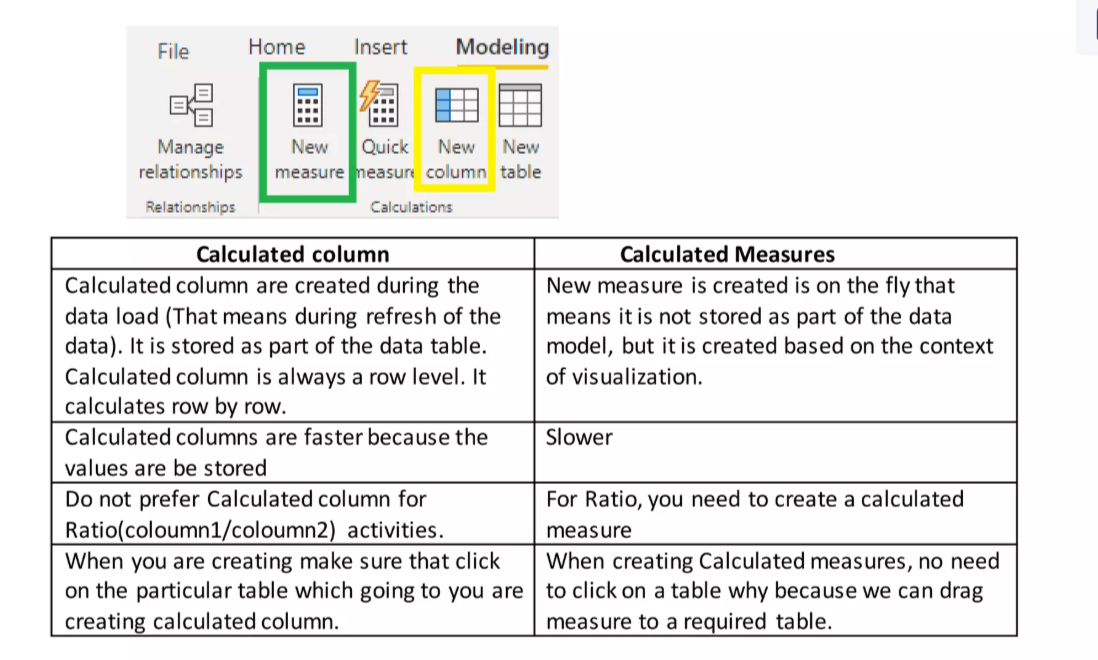
**Answer:**

1. **Use DirectQuery or Import Mode Wisely:** Choose DirectQuery for real-time data and Import for better performance.
2. **Granularity** Pre-aggregate data at the source level to reduce rows and columns.
3. **Reduce Cardinality:** Remove unnecessary columns or high-cardinality columns.
4. **Efficient Data Modeling:**
   * Use Star Schema instead of Snowflake.
   * Set appropriate relationships and avoid bidirectional filtering unnecessarily.
5. **DAX Optimizations:**
   * Replace complex measures with calculated columns when possible.
   * Avoid using CALCULATE and FILTER unnecessarily.
   * nested functions
6. **optimize SQL queries and data workflows**

### **2. Explain the difference between calculated columns and measures in Power BI. When would you use one over the other?**

**Answer:**

* **Calculated Columns:**
  + Created at the row level and stored in the model.
  + Use when you need new fields for filtering, slicing, or categorizing.
  + Example: Profit Margin = (Sales - Cost) / Sales.
* **Measures:**
  + Calculated dynamically during runtime.
  + Use for aggregations or calculations based on interactions and filters in visuals.
  + Example: Total Sales = SUM(Sales).
* **When to Use:**
  + Use **calculated columns** for static data transformations.
  + Use **measures** for aggregations and dynamic calculations in visuals.



### **3. What are the different types of joins in Power BI, and how do they work in Power Query?**

**Answer:**

* **Inner Join:** Includes only matching rows from both tables.
* **Left Outer Join:** All rows from the left table and matching rows from the right.
* **Right Outer Join:** All rows from the right table and matching rows from the left.
* **Full Outer Join:** All rows from both tables, matching where possible.
* **Anti Joins:**
  + Left Anti Join: Rows in the left table not present in the right.
  + Right Anti Join: Rows in the right table not present in the left.

**Implementation in Power Query:**

1. Navigate to **Home > Merge Queries**.
2. Select the join type from the dropdown.
3. Choose columns to match between tables.

### **4. How do you handle dynamic filtering in Power BI?**

**Answer:**

* Use **Slicers** or **Filters:** Add slicers on the report page to allow users to filter dynamically.
* Use **Row-Level Security (RLS):**
  + Create roles with filters (e.g., [Region] = "North").
  + Assign users to roles for tailored views.
* **Dynamic Measures:**
  + Use DAX to create measures that adapt based on user selections.
  + Example:

Sales by Selection =   
SWITCH(  
    TRUE(),  
    SELECTEDVALUE(Region) = "North", SUM(Sales[North Sales]),  
    SELECTEDVALUE(Region) = "South", SUM(Sales[South Sales]),  
    SUM(Sales[Total Sales])  
)

### **5. How would you debug a DAX expression in Power BI?**

**Answer:**

* **Check Intermediate Results:**
  + Break the DAX formula into smaller pieces and evaluate them using **RETURN**.
  + Example:

VAR TotalSales = SUM(Sales[Amount])  
RETURN TotalSales

* **Use DAX Studio:**
  + Analyze query execution steps and performance bottlenecks.
* **Evaluate in a Table:**
  + Test the formula by creating a table visual with relevant fields and measures.
* **Use Error Messages:**
  + Pay attention to Power BI's error messages to identify syntax or logic issues.

### **6. What is the use of aggregations in Power BI, and how do you implement them?**

**Answer:**

* **Purpose:**
  + Improve performance by pre-aggregating data.
  + Reduce the dataset size by storing summarized information.
* **Implementation:**
  + Enable **Manage Aggregations** in Power BI Desktop.
  + Specify columns for aggregation (e.g., SUM, COUNT).
  + Configure relationships with detailed data tables.

### **7. Explain the use of bookmarks in Power BI and provide a practical example.**

**Answer:**

* **Purpose:**
  + Save and restore specific views of a report.
  + Enhance navigation and storytelling.
* **Use Case Example:**
  + Create bookmarks for different filter states (e.g., Sales by Region, Sales by Product).
  + Add buttons to navigate between bookmarks for an interactive report.

### **8. How does Power BI handle time intelligence, and what DAX functions are commonly used?**

**Answer:**

* Power BI includes **Date Tables** and DAX **Time Intelligence Functions** for calculations over time.
* Common DAX Functions:
  + **TOTALYTD**: Year-to-date calculations.
  + **PREVIOUSMONTH**: Returns results for the previous month.
  + **SAMEPERIODLASTYEAR**: Compares values from the same period last year.
  + **DATESINPERIOD**: Aggregates over custom time frames.

### **9. How do you implement Row-Level Security (RLS) in Power BI?**

**Answer:**

* **Steps:**
  1. Go to **Modeling > Manage Roles**.
  2. Create a role and define filters on tables (e.g., [Region] = "North").
  3. Test roles in the Power BI Desktop by switching to **View as Role**.
  4. Publish the report and assign roles to users in the Power BI Service.

### **10. Explain the difference between KPI and Card visual in Power BI. When would you use each?**

**Answer:**

* **KPI Visual:**
  + Displays a key metric along with its trend and target comparison.
  + Use for tracking performance against a goal.
* **Card Visual:**
  + Displays a single value (e.g., total sales).
  + Use for simple summaries or standalone metrics.

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| **1. Prepare the Data (15–20%)**  * Get data from various sources (SQL Server, Excel, SharePoint, etc.). * Clean, transform, and load data using **Power Query**. * Profile and examine the data for inconsistencies. * Optimize data for performance and storage. | |
| Data source settings in Power query   * Clearing permissions * Editing permissions * Modifying file path   Import instead of Direct Query benefits:   * Q&A support * Quick insights PBI service support   Direct Query benefits   * Minimize local disk space * Minimize data refresh   “Time out expired” (available bandwidth and low latency)   * Divide SQL to separate data sources   Anamolies of 10,000 excel rows   * Column Profile view * Power Query editor * Profiting status > entire dataset   Outliers in Text column   * Top and Bottom in Value distribution   M code   * Advance Editor in Power Query Editor   Remove and no new columns   * Select Columns   Flatten Parent Child Hierarchy  ExceptPath, PathItem CrossJoin | Custom R visual   * Install R on your computer   Power BI dataset discoverable   * Certify the dataset * Promote the dataset   The shared folder require a gateway as it is not available to the internet.  SharePoint Online, OneDrive, and OneDrive for Business, refreshed as cloud data sources without a gateway.  source table does includes data but not import   * Use the CAST function in the SQL statement.   benefit of using a Power BI dataset instead of multiple report databases   * reduces the number of datasets, refreshes, and storage requirements |
| **2. Model the Data (30–35%)**  * Design and develop **star and snowflake schemas**. * Define and create **calculated tables, columns, and measures using DAX**. * Implement relationships, hierarchies, and role-based security. * Optimize model performance by managing aggregations. | |
| IND JAN22 FEB22  US JAN22 FEB22  UK JAN22 FEB22   * Unpivot Other columns   Pivot Columns  SalesOrder SalesOrdDetails SalesID   * Merge in Left join   Cardinality to avoid for ambiguity   * Many to many | relationship from a fact table to a dimension table   * Many-to-one   From the Model /Report view, right-click and select Create hierarchy. |
| **Time intelligence and Calendar** | |
| Auto generated daytime data type columns   * Mark as **date table** for the calendar table * Disable auto date time from the **current file**.   DAX quick measure not against direct query.   * Time in intelligence | Current Inventory Count returns only the current total number of inventory items   * LASTDATE |
| **3. Visualize and Analyze the Data (25–30%)**  * Build and format **interactive reports and dashboards**. * Implement **advanced visuals** like KPI indicators, slicers, and maps. * Apply **conditional formatting, bookmarks, and tooltips** for better insights. * Perform **statistical analysis using Power BI visuals**. | |
| Using DAX columns but not DAX calculated measure.   * As a filter on this page. * As an item in the fields well   using variables in DAX measures.   * Improve overall performance. by cache * Improve overall readability   Best selling products   * TOPN   Alerts are available with KPI visuals, gauges, and cards.  Themes use the JSON file format | 2OrMoreDimensionsCrossHighlights   * Matrix   Conditional formatting   * Matrix, Tables   Sequentially connected stages   * Funnel   Employees ranking chart and overall trends   * Ribbon   Stacked column charts remove date hierarchy   * Remove date from X axis   Edit interactions   * Filter and highlight   Less than 1% of its value   * filter   Bookmark toggle visuals   * ❌ Data * ❌ Current Page * ✅Display   Bookmark hide a visual   * Hide in Selection pane |
|  | |
| **4. Deploy and Maintain Assets (20–25%)**  * Publish reports to **Power BI Service** and configure refresh schedules. * Set up and manage **row-level security (RLS)**. * Implement **Power BI dataflows** and workspaces. * Troubleshoot performance issues and optimize reports. | |
| Data refresh using Microsoft 365 credentials   * One drive for business * Sharepoint – teams sites   Change server name in PBI service   * Create parameter * Update server source as parameter   UPN equals to user principal name.   * DAX expression filter * Create a role   Data engine cache will not impact the test results.   * Connect DAX studio to the data model. | Power BI dashboard   * Power BI service   Pinned visuals for dashboard   * Custom visual, images   Notification   * Email, Notification centre   Row level security   * Create a role   Update workspace with least privileges   * Admin |
| **5. Work with Power BI Service & Advanced Features (5–10%)**  * Configure **subscriptions and alerts** for report updates. * Implement **AI-powered insights** like Q&A and Smart Narratives. * Integrate Power BI with **Power Automate and Power Apps** for automation. | |
| Improve Q&A search abilities  * Add linguistic schema to dataset * Add synonyms to model fields   Native AI visual   * Key influencers visual   Visual NOT in the workspace   * Ask a question about your data   Workspace refreshes per day   * 8 | data engine cache   * Connect DAX Studio to the data model. |
|  |  |