

Mix Data Modes Without Slowing Down Power BI



What Are They?

- A Composite Model blends Import and DirectQuery modes.
- It allows a single report to use both types.
- Import mode caches data in Power BI for speed.
- DirectQuery mode runs queries live on the source database.
- Use it when you need real-time data on top of historical data.
- It is powerful but requires careful planning.



The Golden Rule

- Push transformations to the source system whenever possible.
- Avoid complex calculated columns in DirectQuery tables.
- Let the database engine do the heavy lifting.
- Use Import mode for small, frequently filtered tables.
- Use DirectQuery for large, frequently updated tables.
- Prioritize performance over minor data preparation convenience.



Optimize Storage Modes

- Set smaller tables to Dual or Import mode.
- These can act as filters for larger DirectQuery tables.
- This reduces the number of queries sent to the source.
- Use Import for static data like date or category tables.
- Use DirectQuery for fact tables with billions of rows.
- Review table properties to assign the correct storage mode.



Mind Your Relationships

- Ensure relationships are based on indexed database columns.
- Prefer single-directional relationships in the model.
- Avoid bi-directional relationships across Composite Models.
- They can force unnecessary data source queries.
- Use integer-based keys for relationships for best performance.
- Validate relationships to prevent cross-database joins if possible.



Calculated Columns Caution

- Creating calculated columns on DirectQuery tables is expensive.
- Each is computed during the query, slowing response time.
- Create these columns in the source database instead.
- If you must, keep them very simple.
- Use Import mode for tables requiring complex calculations.
- This improves overall report rendering speed.



Limit Visual Interactions

- Each visual can trigger a query to the database.
- Too many interactive visuals on one page creates congestion.
- Use bookmarks and buttons to navigate instead.
- Design pages with a clear purpose and limited visuals.
- Use slicers wisely, as they trigger queries on change.
- Test page performance with all interactions enabled.



Leverage Aggregations

- Use Aggregations to dramatically improve performance.
- Create an Import summary table for a huge DirectQuery fact table.
- Power BI automatically uses the faster Import aggregate.
- It only goes to DirectQuery for detailed drill-through.
- This is a top technique for managing massive datasets.
- It provides a balance between speed and data freshness.



Test and Monitor

- Always test with realistic data volumes and user filters.
- Use Performance Analyzer in Power BI Desktop to find bottlenecks.
- Monitor query execution times on your database server.
- Start simple and add complexity only if needed.
- Document your model's design for future reference.
- A well-planned model is a fast and scalable model.



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