Lab Manual: Designing and Implementing a Fact Constellation Schema in Power BI

Objective

1. Understand the fact constellation (galaxy) schema conceptually and when to use it.
2. Design a fact constellation schema for a retail scenario involving Sales and Inventory facts sharing common dimensions.
3. Prepare sample data, transform it in Power Query, and implement the schema in Power BI Desktop.
4. Create measures, visuals, and test scenarios demonstrating the benefits of shared dimensions.

1. Overview: What is a Fact Constellation Schema?

A fact constellation (galaxy schema) consists of multiple fact tables that share one or more dimension tables.
It's useful when you have several business processes (e.g., sales and inventory) that use the same dimensions (date, product, store).

2. Scenario & Requirements

Scenario: Retail Chain "Contoso Retail"
Business processes:
- FactSales: transactional sales
- FactInventory: daily stock snapshot
Shared dimensions: Date, Product, Store, Promotion

3. Logical Schema (ER Diagram)

Dimensions: DimDate, DimProduct, DimStore, DimPromotion
Facts: FactSales, FactInventory
Both fact tables share Date, Product, Store dimensions.

4. Sample Data Files (CSV)

Prepare CSV files for DimDate, DimProduct, DimStore, DimPromotion, FactSales, and FactInventory with relevant attributes.

5. Step-by-step in Power BI Desktop

- Load CSV files
- Transform in Power Query (data types, cleaning)

- Create relationships in Model view (1-to-many from dims to facts)
- Mark DimDate as Date Table
- Create measures in DAX
- Build visuals (tables, line charts, slicers)

6. Exercises

1. Compare sales vs stock quantities for last 6 months
2. Build measure Avg Daily Sales (30 days)
3. Compute Days of Stock
4. Compare promotional vs non-promotional sales

7. Common Pitfalls

- Mismatched key types
- Missing dimension rows
- Ambiguous relationships
- Excessive bi-directional filters
- Time mismatch between sales and inventory snapshots

8. Deliverables

1. Power BI .pbix file with constellation schema
2. 1-page insights report
3. Input data CSVs or SQL scripts