# SQL and Power BI Report Development

Suppose your company has a database named ‘ContosoRetailDW’’. The database has some tables that are not ready to be used directly for analytics.

You need to create some database objects (tables, views, etc.) based on the existing tables to help perform some analytics. You should create all the objects under a custom schema.

1. Create a table named ‘Product’ based on the ‘DimProduct’, ‘DimProductCategory’, and ‘DimProductSubcategory’ tables. The Product table should contain the following columns.

* ProductKey (Primary key)
* ProductName
* Manufacturer
* BrandName
* ClassName
* ColorName
* Size
* UnitCost
* UnitPrice
* ProductSubcategoryName
* ProductCategoryName

1. Create a view named ‘Channel’ that should have the following columns.

* ChannelKey (Primary key)
* ChannelName

1. Crate a ‘Store’ table based on ‘DimStore’, ‘DimEntity’, ‘DimGeography’, ‘DimSalesTerritory’, and ‘DimEmployee’. The ‘Store’ table should have the following columns.

* StoreKey (Primary key)
* StoreType
* StoreName
* ContinentName
* CityName
* StateProvinceName
* RegionCountryName
* SalesTerritoryRegion
* TerritoryManagerName
* StoreManagerName

1. Create a ‘Date’ table with the following columns. (**Note:** You should remove spaces, and any special characters from the existing DateKey column. For example, convert ‘2005-01-01 00:00:00.000’ to ‘20050101000000000’.)

* Datekey (Primary key)
* FullDateLabel
* DateDescription
* CalendarYear
* CalendarYearLabel
* CalendarHalfYear
* CalendarHalfYearLabel
* CalendarQuarter
* CalendarQuarterLabel
* CalendarMonth
* CalendarMonthLabel
* CalendarWeek
* CalendarWeekLabel
* CalendarDayOfWeek
* CalendarDayOfWeekLabel
* FiscalYear
* FiscalYearLabel
* FiscalHalfYear
* FiscalHalfYearLabel
* FiscalQuarter
* FiscalQuarterLabel
* FiscalMonth
* FiscalMonthLabel
* IsWorkDay
* IsHoliday
* HolidayName
* EuropeSeason
* NorthAmericaSeason
* AsiaSeason

1. Create a ‘Budget’ table based on ‘FactSalesQuota’ and ‘DimScenario’ with the following columns.

(**Note:** The table must contain only the rows that are associated with budget. You should remove spaces, and any special characters from the existing DateKey column. For example, convert ‘2005-01-01 00:00:00.000’ to ‘20050101000000000’.)

* SalesQuotaKey (Primary key)
* ChannelKey (Foreign key)
* StoreKey (Foreign key)
* ProductKey (Foreign key)
* DateKey (Foreign key)
* ScenarioKey
* SalesQuantityQuota
* SalesAmountQuota
* GrossMarginQuota

1. Create a ‘Sales’ table with the following columns. (**Note:** You should remove spaces, and any special characters from the existing DateKey column. For example, convert ‘2005-01-01 00:00:00.000’ to ‘20050101000000000’.)

* SalesKey (Primary key)
* DateKey (Foreign key)
* ChannelKey (Foreign key)
* StoreKey (Foreign key)
* ProductKey (Foreign key)
* UnitCost
* UnitPrice
* SalesQuantity
* ReturnQuantity
* ReturnAmount
* DiscountQuantity
* DiscountAmount
* TotalCost
* SalesAmount

1. If you are done with the previous tasks (From 1 to 6), you have six tables/views. Among these, four tables/views are dimensions (Product, Channel, Store, Date), and the remaining are facts (Budget, Sales).

Now, you are ready to do some ad hoc analysis. You are recommended to find the answers to the following questions with help of both SQL and Power BI Desktop.

1. Find the channel-wise sales variance in descending order.

**Note:** Sales variance = ((Sales – Budget)/Budget) \* 100

1. Find product wise total sales in ascending order where sales are greater than 10000
2. Create a function that returns the lowest performing channel
3. Which product has been returned most frequently?
4. Find the store where the sales variance is maximum?
5. What is the highest selling product, in terms of sales amount?
6. Create a function that returns the top performing product category
7. Which North American store generated the highest revenue?
8. What is the highest selling product subcategory in terms of quantity?
9. Beijing is the city where total sales are maximum. True or False. If false, which city has the maximum total sales?

**Problem 2:** Last week we successfully developed a semantic model using the Contoso dataset in Power BI, leveraging the Import mode for data loading. All necessary transformations were carried out in Power Query, and the semantic model has been fine-tuned to generate insightful reports. However, a new set of challenges has been presented to ensure better scalability, maintainability, and integration with other systems.

**Your New Mission:**

You must now refine your approach and implement the following changes to the semantic model and reporting process:

1. **Source-Based Transformations**:
   * All data transformations currently being done in Power BI (using Power Query) must now be performed directly in the SQL Server database. This includes calculated columns, data type conversions, filtering, and any other manipulation.
   * Ensure that the SQL scripts used for transformations are optimized for performance, as the dataset size may grow significantly in the future.
2. **Model Size:** Semantic model size should be less than 5 MB.
3. **Dynamic Data Source Updates**:
   * Implement a mechanism that allows for easy updates to the data source without requiring manual adjustments in the Power BI desktop file.
4. **Report Publishing and Refresh**:
   * Publish the updated report to the Power BI Service.
   * Ensure that scheduled data refresh works seamlessly, even with the new source-based transformations. Monitor and fix any errors that arise during the refresh process.
5. **Data Validation and Consistency**:
   * Perform a detailed comparison between the original Power BI transformations and the new SQL-based transformations to ensure the data remains consistent.
   * Address any discrepancies and document the resolution steps.