

# Retail Sales Analytics – Grade & Product Mix Analysis

## 1. Data Flow (Simplified)

Data Sources (BEA, US Census) → Data Ingestion (Excel / CSV Uploads) → Data Storage (SQL Database) → Data Transformation (Python, Power Query) → Data Visualization (Power BI Dashboards) → Insights & Decision Making

## 2. Data Flow Summary (High-Level)

Element	Description
Data Ingestion	Sales and benchmark data sourced from BEA and US Census datasets.
Staging / Load	Raw data stored in SQL staging tables to preserve original format.
Transformation / Cleaning	Python (Pandas) used to clean, reshape, and standardize data.
Analysis Layer	Cleaned data stored in analytical tables for KPI calculation and EDA.
Output / Delivery	KPIs and insights delivered through Power BI dashboards and Excel reports.

## 3. Key Components & Technologies

Component	Technology	Role
Data Sources	BEA, US Census	Provide official US retail sales and benchmark data
Processing Engine	Python (Pandas)	Data cleaning, transformation, preprocessing
Data Storage	SQL Database	Centralized analytical data storage
Query & Metrics	SQL	Aggregation, KPI calculation, validation
Visualization	Power BI	Interactive dashboards and reporting