High Level Design Document

Introduction

This High Level Design (HLD) document outlines the architecture and core components for **Trendly - E-commerce Sales Trends Visualizer**. The project aims to deliver a Power BI dashboard for an e-commerce company, enabling visualization of sales trends, top products, and customer segments using imported SQL data and DAX calculations.

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1. System Architecture Overview

Architecture Description:
Trendly consists of three main layers: Data Source (SQL Database), Data Processing (Power BI Data Model with DAX), and Visualization (Power BI Dashboard). Data is extracted from the SQL database, transformed and modeled in Power BI, and presented via interactive dashboards.

Module/Component	Role/Responsibility
SQL Database	Stores raw e-commerce sales, product, and customer data
Power BI Data Import	Connects to SQL, imports and refreshes data
Data Model & DAX Layer	Transforms data, defines measures and calculations
Power BI Dashboard	Visualizes trends, top products, and segments

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2. Component Interactions

Step	Interaction Description
1	Power BI connects to SQL Database and imports relevant tables (sales, products, customers)
2	Data Model & DAX Layer processes imported data, creating calculated columns/measures
3	Power BI Dashboard consumes processed data to render visualizations and reports
4	Users interact with dashboard filters and visuals for insights

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3. Data Flow Overview

Source	Transformation/Processing	Destination
SQL Database	Data Import via Power BI	Power BI Data Model
Power BI Model	DAX Calculations & Aggregations	Dashboard Visuals
Dashboard	User Interactions (filters, drill)	Visual Output

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4. Technology Stack

Layer/Function	Technology/Framework
Data Storage	SQL Database (e.g., MS SQL)
Data Analytics & BI	Power BI Desktop/Service
Data Modeling	Power BI Data Model, DAX
Visualization	Power BI Dashboard

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5. Scalability & Reliability

- **Scalability:**
  Power BI supports scheduled data refreshes and can connect to scalable SQL databases. For larger datasets, DirectQuery or incremental refresh can be configured.
- **Reliability:**
  Data integrity is maintained via scheduled refreshes and secure SQL connections. Power BI access controls ensure data security.
- **Security:**
  Role-based access in Power BI and secure database credentials protect sensitive business data.

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