**Low-Level Design (LLD) Document for Financial Analytics Dashboards**

### 1. Overview

This Low-Level Design document details the technical implementation of the Sales and Customer dashboards for Financial Analytics, built in Tableau. It specifies data preparation, visualization choices, interactivity settings, and calculations used to meet the requirements for analyzing sales performance and customer data.

### 2. Data Preparation

Datasets Used:

- Customers: Contains customer ID, name, segment, and region.

- Orders: Includes order ID, customer ID, product ID, quantity, sales, and profit.

- Products: Details on product category, subcategory, and name.

- Locations: Information on region, state, and city for each order.

Data Preprocessing Steps:

1. Data Linking: Relationships are defined between tables to connect customers, orders, products, and locations. Primary keys like customer\_id and order\_id are used for joining tables.

2. Filtering Data: Data is filtered for the current and previous years to enable year-over-year (YOY) comparisons.

3. Calculated Fields:

- Sales Growth Rate: (Current Year Sales - Previous Year Sales) / Previous Year Sales

- Profit Margin: Profit / Sales

- Weekly Averages: Calculated using a weekly date field.

### 3. Dashboard Components

#### Sales Dashboard

1. KPI Overview

- Description: Displays key metrics such as total sales, profit, and quantity for the current and previous years.

- Visualization: BANs (Big-Ass Numbers) for each metric.

- Calculations:

- Total Sales: SUM([Sales])

- Total Profit: SUM([Profit])

- YOY Sales and Profit Comparison: (Current Year - Previous Year) / Previous Year

- Interactivity: No filters, but the BANs are color-coded based on whether the KPI improved or declined from the previous year.

2. Monthly Sales Trends

- Description: Line chart showing monthly sales and profit trends for both the current and previous years.

- Visualization: Dual-axis line chart with one line for sales and another for profit.

- Calculations:

- Monthly Sales and Profit: SUM([Sales]) and SUM([Profit]) aggregated by month.

- Interactivity: Allows users to click on months to filter other dashboard components, highlighting highest and lowest months.

3. Product Subcategory Comparison

- Description: Table comparing sales and profit by product subcategory for the current year.

- Visualization: Heatmap table with color-coding based on sales and profit values.

- Calculations:

- Total Sales by Subcategory: SUM([Sales]) with Subcategory as the dimension.

- Total Profit by Subcategory: SUM([Profit]).

- Sales Growth Comparison: YOY calculations for each subcategory.

- Interactivity: Product subcategories can be filtered or highlighted. Allows users to explore high- and low-performing subcategories visually.

4. Weekly Sales & Profit Trends

- Description: Tracks weekly trends for sales and profit, with averages highlighted.

- Visualization: Line chart with color-coding to highlight above-average and below-average weeks.

- Calculations:

- Weekly Sales: SUM([Sales]) by week.

- Weekly Average: WINDOW\_AVG([Sales]).

- Interactivity: Users can click on weeks to explore specific weekly patterns in greater detail.

#### Customer Dashboard

1. KPI Overview

- Description: Summarizes the total number of customers, average sales per customer, and order totals.

- Visualization: BANs for each KPI.

- Calculations:

- Total Customers: COUNTD([Customer ID])

- Average Sales per Customer: SUM([Sales]) / COUNTD([Customer ID])

- Total Orders: COUNTD([Order ID])

- Interactivity: No filters but uses color-coding to indicate KPI improvements from the previous year.

2. Monthly Customer Trends

- Description: Displays monthly customer trends, highlighting months with the highest and lowest customer interactions.

- Visualization: Line chart for monthly customer engagement, with markers for peak and low months.

- Calculations:

- Monthly Customer Count: COUNTD([Customer ID]) by month.

- Total Orders per Month: COUNT([Order ID]).

- Interactivity: Clicking on months filters the dashboard to highlight corresponding data points for that period.

3. Customer Distribution by Number of Orders

- Description: Visual representation of customers segmented by order count, offering insights into customer loyalty.

- Visualization: Bar chart showing the count of customers by number of orders.

- Calculations:

- Customer Order Count Distribution: Count of orders aggregated by customer.

- Interactivity: Interactive chart where users can filter data by customer order groups to analyze engagement levels.

4. Top 10 Customers by Profit

- Description: Shows the top 10 customers by profit, with additional customer metrics.

- Visualization: Table with columns for customer rank, number of orders, current sales, current profit, and last order date.

- Calculations:

- Rank by Profit: RANK\_UNIQUE(SUM([Profit])).

- Last Order Date: MAX([Order Date]) for each customer.

- Interactivity: Each row is clickable, allowing users to drill down into a specific customer’s profile or purchase history.

### 4. Filters and Interactivity Settings

- Filters:

- Date Filter: Allows users to select a specific year for analysis.

- Product Filter: Filters data by product category and subcategory.

- Location Filter: Allows filtering by region, state, and city.

- Dashboard Navigation: Users can toggle between the Sales and Customer dashboards using a navigation menu.

- Color-Coding and Tooltips: Tooltips display additional data on hover, such as YOY growth percentages, and color-coding is used to highlight metrics that are significantly high or low.

### 5. Layout Specifications

- Sales Dashboard Layout:

- Top section: KPI Overview BANs for a quick summary of sales and profit metrics.

- Middle section: Line charts and sparklines for monthly and weekly trends.

- Bottom section: Product subcategory table and color-coded comparisons.

- Customer Dashboard Layout:

- Top section: KPI Overview BANs for customer engagement metrics.

- Middle section: Monthly customer trends and distribution by orders.

- Bottom section: Table for top 10 customers by profit.

### 6. Data Flow and Security

Data flows from a central database to Tableau, where it is processed using Tableau’s calculated fields and data visualization features. Access to dashboards is controlled through Tableau Server or Tableau Online, where permissions are role-based to ensure that only authorized users can access and interact with the dashboards.

### 7. Performance Optimization

- Extracts: Use of Tableau data extracts to optimize performance and reduce load times.

- Data Aggregation: Pre-aggregating metrics such as total sales and profit in the database, when possible, to reduce calculations within Tableau.

- Calculated Fields Optimization: Limiting calculated fields to avoid complex, repetitive calculations that may impact performance.

### 8. Testing and Validation

- Functionality Testing: Verify that filters, navigation, and interactivity work as intended.

- Data Validation: Validate the accuracy of calculations against raw data sources.

- Performance Testing: Test load times and optimize extracts and calculations as needed.

- User Feedback: Conduct user testing to ensure dashboards meet user expectations and refine interactivity and usability as needed.

This LLD document provides the detailed implementation steps, from data preparation to layout, visualizations, and interactivity. It serves as a blueprint for ensuring the dashboards function effectively and meet all specified requirements for financial analytics.