



Low Level Design Document

Introduction

This Low Level Design (LLD) document outlines the implementation details for **CareDash - Healthcare KPI Dashboard**. The project aims to deliver a Power BI dashboard for monitoring key healthcare metrics such as patient admissions, discharge rates, and average length of stay, with interactive slicers and filters.

1. System Components

Component	Description	Key Responsibilities
Data Source	Source of healthcare KPI data (CSV/DB/API)	Provide raw data to Power BI
Data Model	Power BI data model (tables, relationships)	Structure and relate data
ETL Process	Data import, transformation, and loading	Clean, aggregate, and load data
Dashboard UI	Power BI report/dashboard	Visualize KPIs, enable interactivity
Slicers/Filters	Power BI slicers and filters	Allow user-driven data exploration

2. Class/Interface Overview

Class/Interface	Description	Key Methods/Attributes
DataConnector	Connects to data source	<code>connect()</code> , <code>fetch_data()</code>
DataTransformer	Cleans and aggregates data	<code>clean_data()</code> , <code>aggregate_kpis()</code>
KpiModel	Represents KPI metrics	<code>admissions</code> , <code>discharges</code> , <code>avg_los</code>
DashboardView	Power BI report/dashboard	<code>render_charts()</code> , <code>apply_filters()</code>

Relationships:

- `DataConnector` → `DataTransformer` → `KpiModel` → `DashboardView`

3. Data Structure Overview

Table/Model	Fields/Attributes
PatientEvents	<code>patient_id</code> , <code>admission_date</code> , <code>discharge_date</code> , <code>dept</code>
KpiAggregates	<code>date</code> , <code>admissions</code> , <code>discharges</code> , <code>avg_length_of_stay</code>

4. Algorithms/Logic



KPI Calculation Flow (Pseudocode):

```
for each day in date_range:
    admissions = count(PatientEvents where admission_date == day)
    discharges = count(PatientEvents where discharge_date == day)
    avg_los = avg(discharge_date - admission_date for discharges on day)
    store in KpiAggregates
```

Dashboard Interactivity:

- Slicers/filters update visualizations by applying user-selected criteria (e.g., date range, department).

5. Error Handling

Scenario	Handling Approach
Data source unavailable	Show error message, retry connection
Data format mismatch	Log error, skip invalid records
Calculation errors (e.g., div/0)	Display 'N/A' or default value
Filter returns no data	Show empty state message in dashboard

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