Project Design Phase

Solution Architecture

Date	5 March 2025
Team ID	PNT2025TMID02578
Project Name	Global Food Production and Trend Analysis
Maximum Marks	4 Marks

Solution Architecture:

Global Food Production Analytics Solution Architecture

1. **Data Sources:**

   o FAO datasets (CSV, Excel, SQL).

   o Public APIs for real-time agricultural data.

   o Manually processed historical datasets.

2. **Data Processing & Transformation:**

   o **Power Query** used for data cleaning and transformation.

   o Creating relationships between datasets (commodities, regions, years).

   o Aggregating data for insights.

3. **Data Modeling & Storage:**

   o Data stored in Power BI's in-memory model.

   o **DAX** used for calculated columns and custom measures (e.g., growth rates, averages).

4. **Visualization & Reporting:**

   o **Dashboards** with:

      ▪ **Gauge, Bar, Stacked, Area, and Donut Charts** for production comparisons and trends.

   o Interactive filtering by **year**, **region**, and **commodity**.

5. **Deployment & Accessibility:**

   o Hosted on **Power BI Service** for real-time access.

   o Reports shared via **Power BI Embedded** & **Mobile** for accessibility.

6. **Scalability & Future Enhancements:**

- o Integration with real-time data sources via APIs.
- o Expansion to include more commodities and regional insights.

This architecture ensures scalable, interactive, and real-time insights into global food production trends.

```mermaid
flowchart TD
    A[CSV Data Source] -->|Raw Data| B[Data Cleaning & Preparation]
    B -->|Processed Data| C[(Data Storage Cloud / Local DB)]
    ADMIN((ADMIN))
    C -->|Data Retrieval| D[Data Visualization & Dashboard Creation]
    ADMIN -.->|Management| D
    D -->|Data Processing| E[KPI Analysis & Insights]
    E -->|Insights| F[Final Report]
    F -->|View Report| USER((USER))
```