10. Solution Architecture

10.1 Overview

The *College Food Choices Visualization System* follows a **modular and scalable architecture**, designed to ingest raw data, process it into insightful dashboards using Tableau, and present it through a Flask-based web application for user access.

This architecture supports **ease of data preparation, visual storytelling, and seamless user interaction** — with minimal backend complexity and high usability.

10.2 Architecture Layers

Layer	Description
Data Layer	Stores structured CSV files containing dietary, lifestyle, and health metrics
Preparation Layer	Cleans and transforms data using Tableau Prep or Excel
Visualization Layer	Creates interactive dashboards and storyboards in Tableau Desktop
Hosting Layer	Publishes dashboards on Tableau Public or Tableau Server
Web Interface Layer	Uses Python Flask to embed the dashboard inside a clean web UI
User Access Layer	Students, researchers, and faculty access the dashboards via browsers

10.3 Architecture Diagram

You can visualize the architecture as follows:
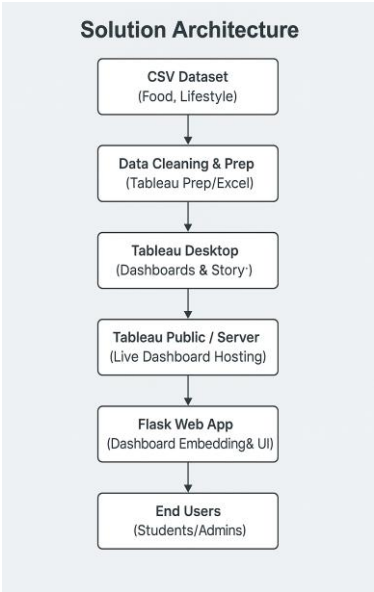
You can create a **visual diagram** from this using draw.io, Canva, or Lucidchart for your final report/PPT.

10.4 Key Characteristics

Characteristic	Details
Modularity	Each layer functions independently, allowing easy updates and scaling
Lightweight Backend	Flask used solely for front-end embedding; no heavy backend logic involved
Platform Independent	Dashboards are web-based and work on all major browsers and devices
Security Compliant	No PII involved; dashboards are shared securely via Tableau Public/Server
Extensibility	Future datasets can be integrated with minimal changes to the architecture

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10.5 Advantages of the Architecture

- ✅ **Quick Development Cycle** – Rapid prototyping using Tableau
- ✅ **Seamless Deployment** – Minimal setup using Flask and Tableau Public
- ✅ **User-Centric Interface** – Designed for students, staff, and health professionals
- ✅ **Maintainable & Scalable** – Easily update data, visuals, or embed logic