Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	28 MAY 2025
Team ID	LTVIP2025TMID48176
Project Name	Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study
Maximum Marks	4 Marks

The Deliverable includes the architectural diagram and the information as per Table 1 & Table 2.

Architectural Diagram: A 3-tier architecture comprising a presentation layer (Tableau for visualizations), an application layer (Python for data processing and analytics), and a data layer (MySQL for structured data storage and cloud storage for scalability). The diagram would illustrate data flow from user inputs to Tableau dashboards, processed via Python scripts, and stored/retrieved from a MySQL database hosted on a cloud platform.

Table-1 : Components & Technologies:

The technology stack for the "Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study" is designed to deliver a scalable, secure, and high-performance platform for analyzing and visualizing student dietary data. The stack leverages Tableau for intuitive, interactive dashboards, Python (with Pandas, NumPy, Scikit-learn, and TensorFlow) for data processing and predictive analytics, and Streamlit for real-time data monitoring. Data is stored in MySQL on Amazon RDS for structured storage and Amazon S3 for file storage, ensuring scalability and accessibility. External APIs like USDA FoodData Central and Fitbit enrich nutritional and health insights. The system is deployed on AWS with Kubernetes for container orchestration, ensuring scalability, while AES-256 encryption, AWS IAM, and OWASP compliance provide robust security. AWS Elastic Load Balancer, multi-AZ deployment, Amazon CloudFront, and Redis caching optimize availability and performance, enabling real-time analytics and data-driven decision-making for student well-being.

S.No	Component	Technology
1	Front-End	Tableau Public / Tableau Server
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Table-2: Application Characteristics:

The application characteristics for the "Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study" ensure a robust, scalable, and efficient system tailored for dietary data analysis. Open-Source Frameworks like Python (Pandas, NumPy, Scikit-learn, TensorFlow) and Apache Kafka enable flexible data processing, machine learning, and real-time streaming. Security Implementations utilize AES-256 encryption, AWS IAM roles, and OWASP top 10 compliance to safeguard sensitive student data. The Scalable Architecture leverages AWS Lambda and Kubernetes for microservices-based deployment, handling large datasets and concurrent users effectively. Availability is ensured through AWS Elastic Load Balancer and multi-AZ deployment, providing high uptime and fault tolerance. Performance is optimized with Amazon CloudFront (CDN) for fast content delivery and Redis for caching, supporting high request throughput and seamless real-time analytics for informed decision-making.

S.No	Characteristics	Technology
S.No	Open-Source Frameworks	Python (Pandas, NumPy, Scikit-learn, TensorFlow), Apache Kafka
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