

## Project Design Phase-II

### I-Revolution: A Data-Driven Exploration of Apple’s iPhone Impact in India

#### Technology Stack (Architecture & Stack)

Date: 31 January 2025

Team ID: **LTVIP2026TMIDS47508**

Maximum Marks: 4 Marks

#### 1. Technical Architecture

The system follows a 3-Tier Architecture consisting of Presentation Layer, Application Layer, and Data Layer. The system collects iPhone sales and market data in India, processes it, performs analysis, and displays interactive dashboards.

Architecture Layers:

- Presentation Layer (Web/Mobile Dashboard – Tableau / React)
- Application Layer (Python Backend – Data Processing & APIs)
- Data Layer (MySQL / Cloud Database for storing datasets)
- Cloud Infrastructure (AWS / Azure for deployment)
- External APIs (Market research APIs, Government open data APIs)

**Table-1: Components & Technologies**

| S.No | Component           | Description  | Technology                                 |
|------|---------------------|--|--|
| 1    | User Interface      | Interactive dashboards for visualizing iPhone sales trends and insights. | HTML, CSS, JavaScript, React JS, Tableau   |
| 2    | Application Logic-1 | Data collection and preprocessing logic.                                 | Python (Pandas, NumPy)                     |
| 3    | Application Logic-2 | Data analysis and trend forecasting.                                     | Python (Matplotlib, Seaborn, Scikit-learn) |
| 4    | Application Logic-3 | API integration and  | Flask / FastAPI                            |

|    |                                 |   |                                |
|----|---------------------------------|---|--------------------------------|
|    |                                 | report generation.                            |                                |
| 5  | Database                        | Stores raw and processed datasets.            | MySQL                          |
| 6  | Cloud Database                  | Cloud-based database for scalable storage.    | AWS RDS / Azure SQL            |
| 7  | File Storage                    | Storage for datasets and generated reports.   | AWS S3 / Local File System     |
| 8  | External API-1                  | Market and economic data integration.         | Government Open Data API       |
| 9  | External API-2                  | Competitor market share data.                 | Market Research API            |
| 10 | Machine Learning Model          | Sales prediction and trend forecasting model. | Scikit-learn Regression Model  |
| 11 | Infrastructure (Server / Cloud) | Deployment of application on cloud platform.  | AWS EC2 / Azure Cloud / Docker |

**Table-2: Application Characteristics**

| S.No | Characteristics          | Description   | Technology                           |
|------|--------------------------|---|--------------------------------------|
| 1    | Open-Source Frameworks   | Use of open-source libraries for backend and visualization.         | Python, Flask, React JS, Pandas      |
| 2    | Security Implementations | User authentication, encrypted passwords, secure API communication. | JWT Authentication, SHA-256, HTTPS   |
| 3    | Scalable Architecture    | 3-tier architecture supporting horizontal scaling.                  | Docker, Kubernetes, AWS Auto Scaling |

|   |              |  |                                     |
|---|--------------|--|-------------------------------------|
| 4 | Availability | High availability with backup and load balancing.        | AWS Load Balancer, Cloud Monitoring |
| 5 | Performance  | Optimized queries, caching and fast dashboard rendering. | Redis Cache, Optimized SQL Queries  |