

## Project Design Phase

### Solution Architecture

Date	June 2025
Team ID	LTVIP2025TMID33624
Project Name	Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables
Maximum Marks	4 Marks

### Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

### Example -

### Architecture Description for Smart Sorting

#### User Interaction

- **User** (Home user / Store manager)  
→ uploads an image of a fruit or vegetable via **web interface** (Flask App)

#### Frontend + Communication Flow

- **Flask Web App** (Hosted on EC2 / Render / Heroku)
  - Receives image from user
  - Sends it to the backend (ML model service)

#### ML Model & Inference

- **Model Inference Service** (Could be a Flask API or FastAPI microservice)
  - Loads pre-trained VGG16-based model (`healthy_vs_rotten.h5`)

- Processes uploaded image and returns prediction: **Fresh / Rotten**

## **Storage & Logs**

- **Amazon S3**
  - Stores uploaded images and model file (.h5)
- **CloudWatch / ELK / Logging Service**
  - Logs prediction activity, timestamps, and user interactions

## **Result Handling & Feedback**

- **DynamoDB / Firebase / MongoDB**
  - Stores prediction history (image name, prediction, timestamp, user ID if applicable)
- **Notification Service**
  - Sends storage tips or warnings (optional) via email or app notifications

## **Security**

- **Key Management Service (KMS)**
  - Encrypts user data and logs
  - Ensures secure storage of uploaded images and sensitive info

## **Optional Add-ons**

- **Analytics Dashboard** (using Grafana or custom HTML page)
  - Visualizes freshness trends, usage patterns
- **Tips Database / Recommendation Engine**
  - Provides fruit/veg-specific storage tips after prediction

Reference: <https://aws.amazon.com/blogs/industries/voice-applications-in-clinical-research-powered-by-ai-on-aws-part-1-architecture-and-design-considerations/>