Project Design Phase-I
Solution Architecture

Date	14 October 2022
Team ID	PNT2022TMID38376
Project Name	IOT Based Smart Crop Protection System for Agriculture
Maximum Marks	4 Marks

Solution Architecture:

Agriculture plays a significant role in the economy of a given country. Agriculture serves as the backbone of the economic system, from providing food to providing employment opportunities.Some people tend to overlook the importance of agriculture. For decades, agriculture has been the source of production of essential food crops. Farming is the primary source of livelihood, even before the world has developed. There are about 70% of people that rely on agriculture as a mean of living. The non-developed agricultural activities are the result of this high percentage.

The country with plenty of supplies of raw materials benefits from exporting them and trading for materials that they do not possess. The raw materials make up the massive portion of what is sold internationally. If a country suffers from a lack of agricultural materials, the prices can go up and disturb the flow of tradeTherefore agriculture is one of the most critical sectors in the world. Whatever you eat, drink or use came from agriculture. It drives the economic system and has major contributions in national revenue.

Since agriculture plays a significant role in dealing with food insecurity and malnourishment. Every nation should strive for a better agricultural sector to cultivate economic growth and lessen the hungry people for that smart agriculture is now adopted to increase agriculture growth. The process of smart agriculture is

Data collection: The sensors installed at all critical places in the farm gather and transmit data about the soil, air, etc

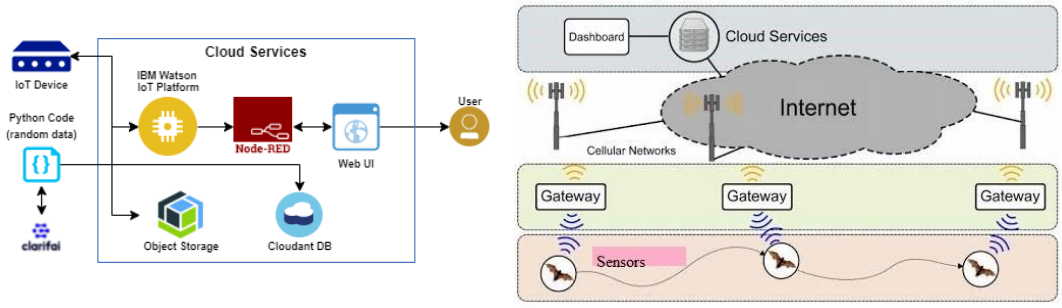
Diagnostics: The data collected is analyzed by the system and conclusions are made regarding the status of the object or process monitored. Potential problems get identified.

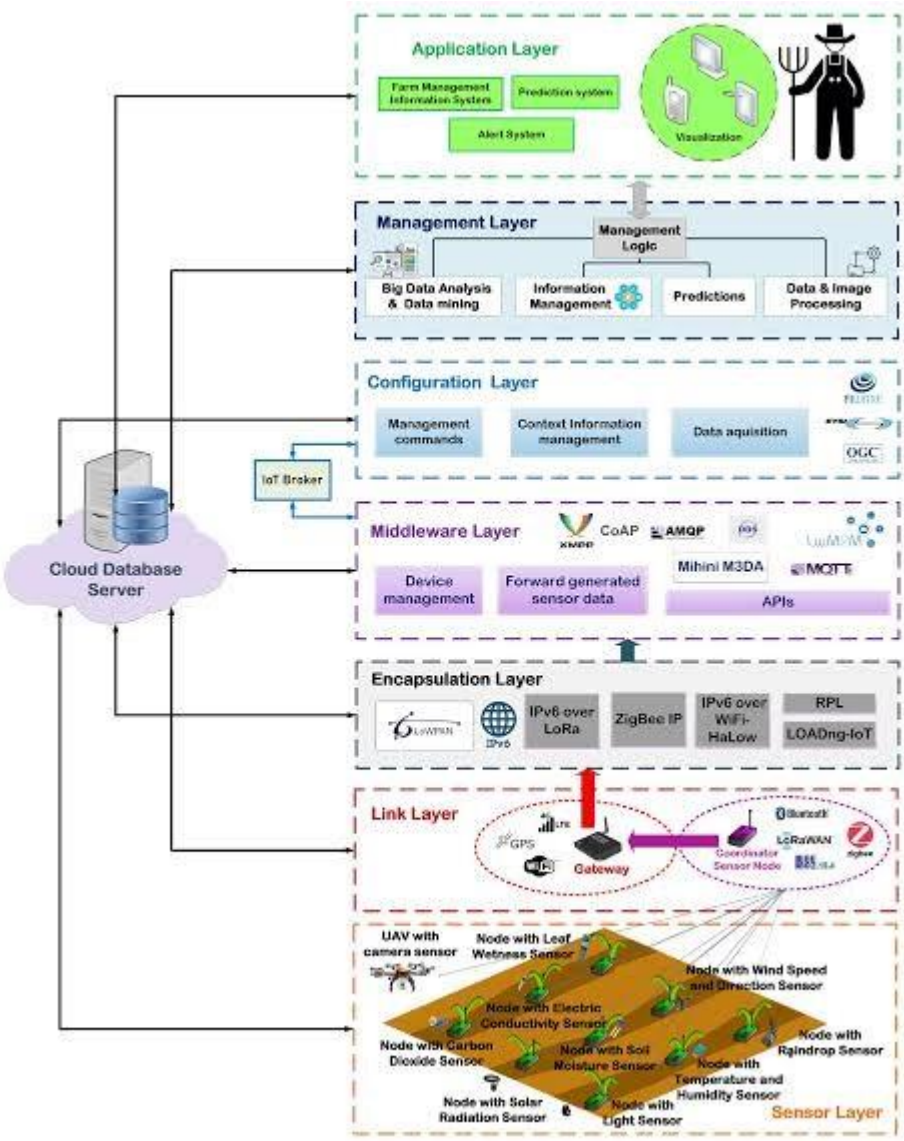
Decision making: Based on the problems identified in the previous steps, the software platform and/or a human managing the platform decides on actions that need to be taken.

Actions: The actions identified in the previous step are performed. A new measurement on the soil, air, moisture, etc is performed by the sensors and the whole cycle starts again.

Smart farming focuses on the application of captured data and combining it from various data sources to show the bigger picture to manage all the activities of the farm. Smart farming is a big leap from traditional farming as it brings certainty and predictability to the table which is the Future of Agriculture.Robotics, drones, and sensors placed throughout the farms can collect data that can be processed to produce farm insights. Cloud-based software can be used to collect the data from farms and combine them with other sources of data to determine yield output, irrigation scheduling, disease outbreaks, pest infestations, and the like. It can also consume off-farm data, such as market information and dealer availability, to enable informed decision-making post-harvest processes.

Solution Architecture Diagram:




Application Layer
Farm Management Information System
Prediction system
Alert System
Visualization
Management Layer
Management Logic
Big Data Analysis & Data mining
Information Management
Predictions
Data & Image Processing
Configuration Layer
Management commands
Context Information management
Data aquisition
OGC
IoT Broker
Cloud Database Server
Middleware Layer
XMPP
CoAP
AMQP
Mihini M3DA
MQTT
Device management
Forward generated sensor data
APIs
Encapsulation Layer
6LoWPAN
IPv6
IPv6 over LoRa
ZigBee IP
IPv6 over WiFi-HaLow
RPL
LOADng-IoT
Link Layer
GPS
LTE
WiFi
Gateway
Bluetooth
LoRaWAN
Zigbee
Coordinator Sensor Node
UAV with camera sensor
Node with Leaf Wetness Sensor
Node with Wind Speed and Direction Sensor
Node with Electric Conductivity Sensor
Node with Carbon Dioxide Sensor
Node with Soil Moisture Sensor
Node with Raindrop Sensor
Node with Temperature and Humidity Sensor
Node with Solar Radiation Sensor
Node with Light Sensor
Sensor Layer