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

Date	16 October 2022
Team ID	PNT2022TMID40121
Project Name	Project – Smart Farmer-IoT Enabled Smart Farming Application

Technical Architecture:
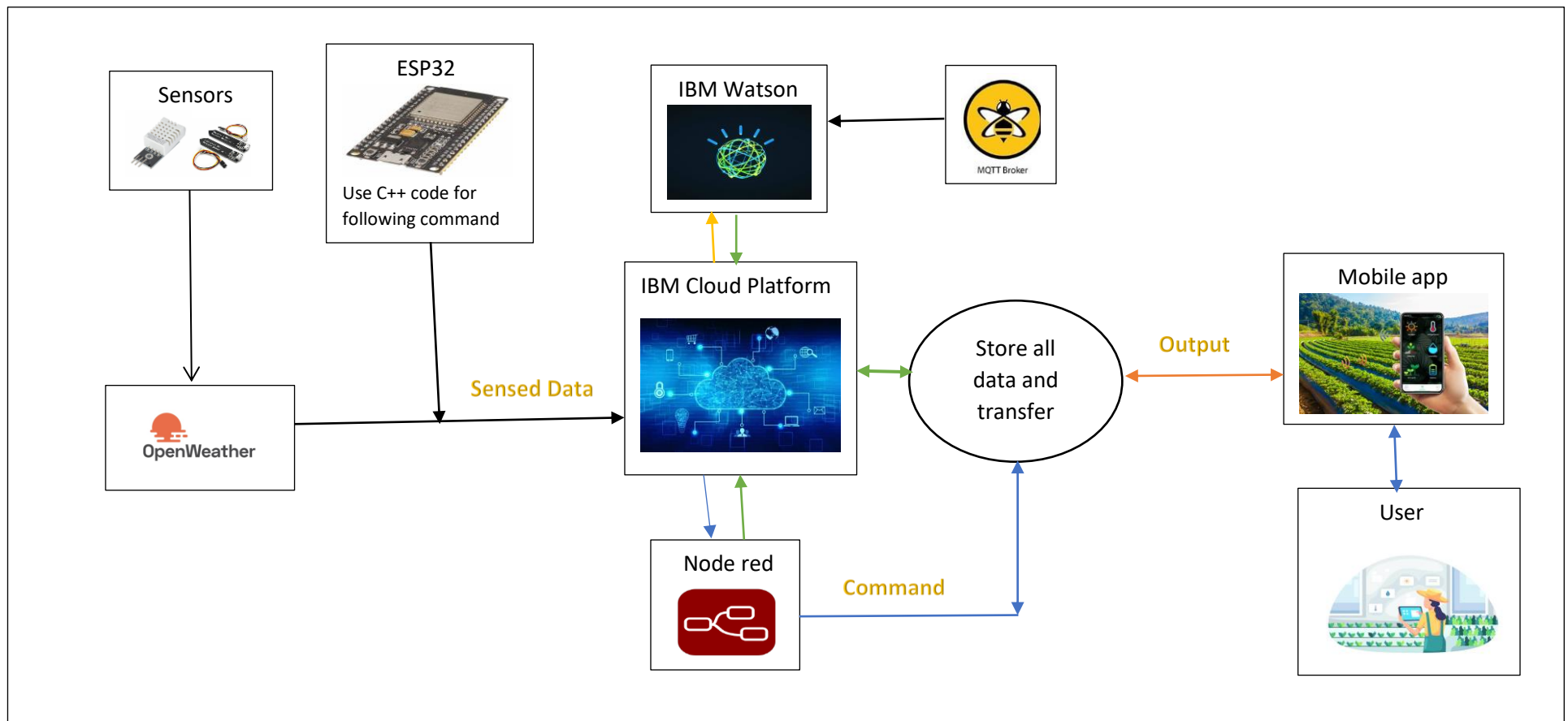
- The different sensors (temperature, humidity, soil moisture) are sensed through the ESP232 processor kit and the weather API.

- ESP232 is used as a processing unit that processes the data obtained from sensors and weather data from weather API.

- Node-red is used for programming, as the tool to wire the hardware, software and APIs. The MQTT protocol is followed as a mediator.

- The overall data given by ESP232, open weather, node-red are stored in the IBM cloud.

- The data which was collected are provided to the user through a mobile application that was developed using the MIT app invertor.

- The water irrigation to plants is automatically done in the right period of time by the instructions which was already programmed.

Table 1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Smart farming solutions work through sensors. Farmers can monitor various conditions like soil moisture, water level, Temperature & humidity from anywhere by combining sensors through Mobile Application.	MIT App Inventor
2.	Application Logic-1	The code will be builded based on certain conditions like assigning task to get the Sensor datas & then based on moisture level the water flow will be controlled and if moisture level exceeds certain level it will also intimate through message.	C++,Python
3.	Application Logic-2	Here we create a device and then connected to the Node-red to develop a software.	IBM Watson STT service

4.	Application Logic-3	Here sensed data will be displayed on the IBM dashboard.	IBM Watson Assistant
5.	Database	We can store all the datas, so that user can retrieve the data whenever required .	Drive, NoSQL, etc.
6.	Cloud Database	In cloud we can store the data and get back the data at any moment & it will displayed on the dashboard. This datas will be stored here safely for future purpose.	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API	Using open weather map as a external source we can collect the weather information.	IBM Weather API
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Wokwi Cloud Server Configuration : IBM	Local, Cloud Foundry

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Farmers can able to control their own data using this technology.	Open weather Map, MIT App Inventor, Wokwi.
2.	Security Implementations	We are using secured Platform like IBM Cloud to store all the datas & we can collect the data whenever we required.	IBM Cloud, IBM Watson Assistant
3.	Scalable Architecture	It can able to handle more amount of works by adding resources to the system. It supports higher workload without any fundamental changes to it.	IBM cloud
4.	Availability	The data gathered from the sensors transfer to the farmers can monitor all information using phone.	Sensors, IBM Watson, Node-red, MIT App
5.	Performance	The received data from the sensors are all together stored in the IBM cloud drive, the message is given to the user application to perform the process. By the data the automatic performance is also done.	Sensors, IBM Watson, Node-red, MIT App