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

| Date | 20 October 2022 |
|------|-----------------|
| Team ID | PNT2022TMID38150 |
| Project Name | **Smart Farmer – IOT Enabled Smart Farming Application** |
| Maximum Marks | 4 Marks |

**Technical Architecture:**
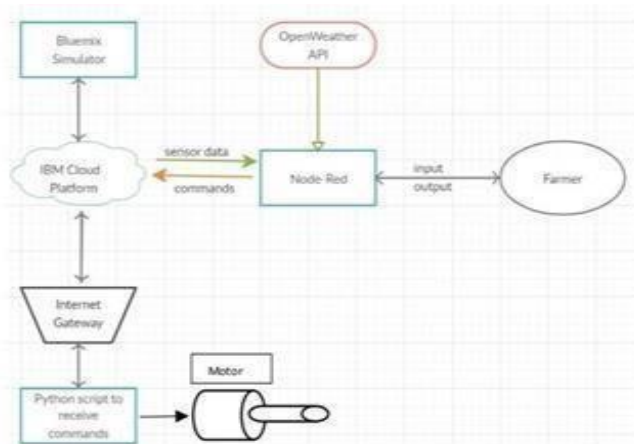


Guidelines:

1. Include all the processes (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services
5. Indicate interface to machine learning models (if applicable)

1. Temperature, soil moisture, and humidity are three separate soil parameter measurements that are made using various sensors and recorded in the IBM cloud.

2. The data from the sensors and weather API are processed using an Arduino UNO as a processing unit.

3. *NODE-RED is used as a programming tool to write the hardware, software and APIs. The MQTT protocol is followed for the communication.*

4. Through a smartphone application created with the aid of MIT App Inventor, the user is given access to all the collected data. Depending on the sensor results, the user might decide whether or not to irrigate the crop using an app. They can control the motor switch remotely by utilising the app.

**Table-1 : Components & Technologies:**

| S.No | Component | Description | Technology |
|---|---|---|---|
| 1. | User Interface | How user interacts with application e.g. Web UI, Mobile App, Chatbot etc. | HTML, CSS, JavaScript / Angular Js / React Js etc. |
| 2. | Application Logic-1 | Logic for a process in the application | Python |
| 3. | Application Logic-2 | Logic for a process in the application | IBM Watson IoT service |
| 4. | Application Logic-3 | Logic for a process in the application | IBM Watson Assistant |
| 5. | Database | Data Type, Configurations etc. | MySQL, NoSQL, etc. |
| 6. | Cloud Database | Database Service on Cloud | IBM Cloud |
| 7. | File Storage | File storage requirements | IBM Block Storage or Other Storage Service or Local Filesystem |
| 8. | External API-1 | Purpose of External API used in the application | IBM Weather API, etc. |
| 9. | Machine Learning Model | Purpose of Machine Learning Model | Object Recognition Model, etc. |
| 10. | Infrastructure (Server / Cloud) | Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration : | Local, Cloud Foundry, Kubernetes, etc. |

**Table-2: Application Characteristics:**

| S.No | Characteristics | Description | Technology |
|------|-----------------|-------------|------------|
| 1. | Open-Source Frameworks | List the open-source frameworks used | Technology of Opensource framework |
| 2. | Security Implementations | Sensitive and private data must be protected from theirproduction until the decision-making and storage stages. | e.g SHA-256, Encryptions, IAM Controls, OWASP etc. |
| 3. | Scalable Architecture | scalability is a major concern for IoT platforms. It hasbeen shown that different architectural choices of IoT platforms affect system capability and that automatic real time decision-making is feasible in an environment composed of dozens of thousand. | Technology used |
| 4. | Availability | Automatic adjustment of farming equipment made possible by linking information like crops/weather andequipment to auto-adjust temperature, humidity, etc. | Technology used |
| 5. | Performance | The idea of implementing integrated sensors with sensing soil and environmental or ambient parameters in farming will be more efficient for overall monitoring | Technology used |