Project Design Phase-II

Technology Architecture

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| Date | 9 October2022 |
| Team ID | PNT2022TMID42977 |
| Project name | SMART FARMER: IOP- Enabled smart farming Application |

Blumish Simulater

Intrnet GateWay

Node-Red

Open Wather API

Input Command

user

output Sensor Data

Sensors and motor on/off switch

Python code to recive command and data

1.Electrochemical sensors provide information sensors for soil nutrient detection .

2.It using different sensors and obtained values are store in the in IBM cloud.

3. Arduino UNO is used as a processing Unit that process the data obtained from the sensors and data from the weather API

**4.** NODE-RED is used as a programming tool to write the hardware, software and APIs.

**5.** The MQTT protocol is followed for communication process.

**6.** Communicating between cloud and the user

**7.** All the collected data are provided to the user through a mobile application that was developed using the MIT app inventor.

**8.** The user could make a decision through an app, whether to water the field or not, depending upon the sensor values. By using the app

**9.** using the app, they can remotely operate the motor switch.

Table 1: Components & Technologies:

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| --- | --- | --- | --- |
| **S.NO** | **Component** | **Description** | **Technology** |
|  | MQTT protocol | The data to be collected and sent to the farmer via MQTT protocol providing the data to easily monitor the crops | IBM Watson IOT service, IBM Watson Assistant |
|  | User Interface | The communication protocol being used might act as an interface | MIT App Inventor |
|  | Arduino UNO | It is used as a processing Unit | Python |
|  | Database | Data Type, Configurations | MySQL |
|  | Cloud Database | Database Service on Cloud | IBM Cloud |
|  | File Storage | Different soil parameters obtained values | IBM Block Storage |
|  | Infrastructure (Server / Cloud) | Application Deployment on Cloud Local Server Configuration: Cloud Server Configuration: | Kubernetes |
|  | External API | To monitor the weather | Open Weather API |

Table 2: Application Characteristics

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| --- | --- | --- | --- |
| **S,NO** | **Characteristics** | **Description** | **Technology 1** |
| 1. | Open-Source Frameworks | MQTT protocol | python |
| 2. | Security Implementation | Sensitive and private data must be protected from their production until the decision-making and storage stages | NOde-Red, Open weather App API, MIT App Invento |
| 3. | Scalable Architecture | Scalability is a major concern for IoT platforms. It has been shown that different architectural choices of IoT platforms affect system scalability and that automatic real time decision-making is feasible in an environment composed of dozens of thousand. | Node-Red service |
| 4. | Availability | Available feasible | Open weather App |
| 5. | Performance | Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN’s) etc | MIT app inventor |