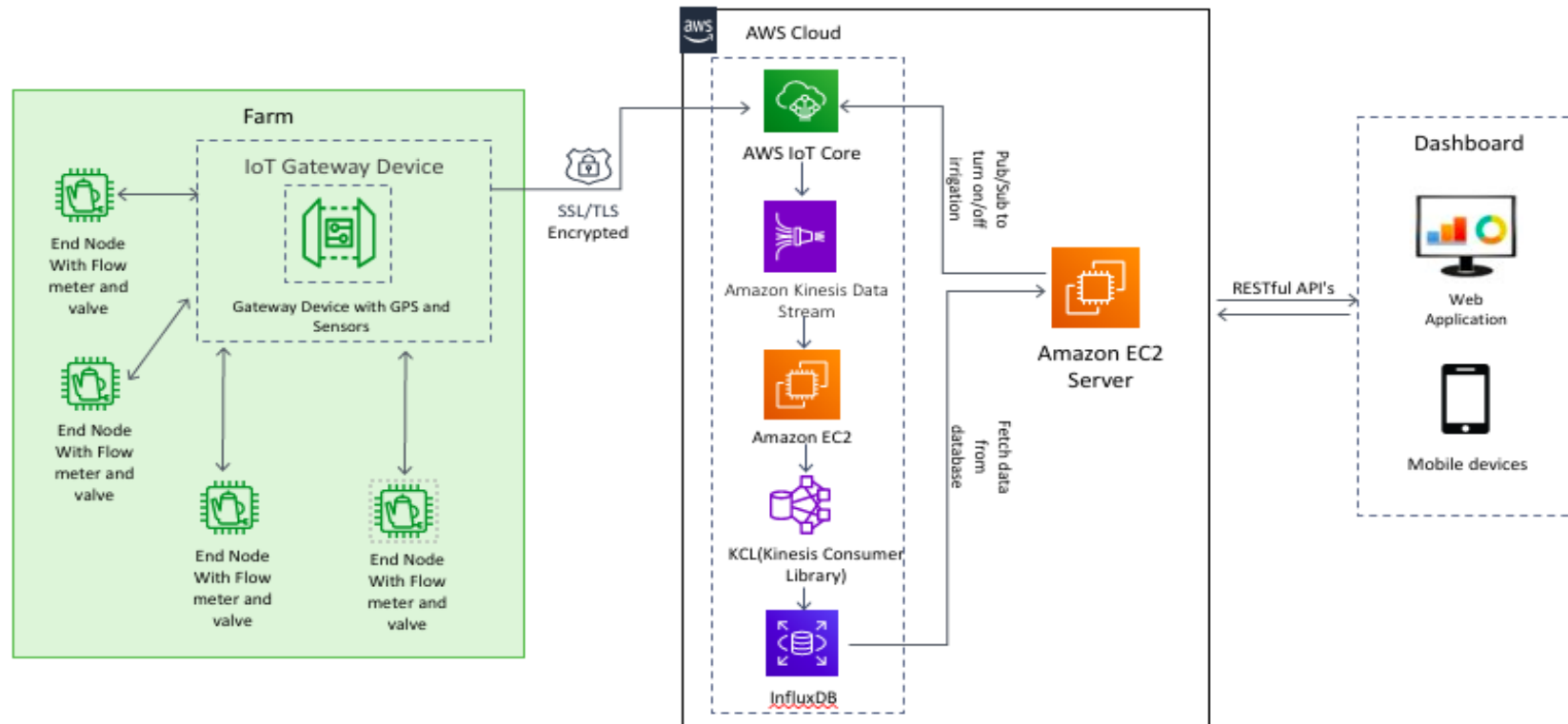


Project Design Phase-II Technology Stack (Architecture & Stack)

Date	15 October 2022
Team ID	PNT2022TMID14459
Project Name	SmartFarmer - IoT Enabled Smart Farming Application
Maximum Marks	4 Marks

Technical Architecture:



- In Smart farming, end node with various sensors are deployed in farm which are connected to the IoT Gateway Device. This gateway has inbuilt GPS and 4G capability. Sensors can measure insolation (the amount of sun over a given area), rainfall, wind speed, air temperature and humidity etc.
- Data which is collected at Gateway is then send to through MQTT protocol over the internet to AWS IoT Core for collection, storeing, and analyzing device data.
- Then this data will be stream through Amazon Kinesis Data Streams (KDS) which is a massively scalable and durable real-time data streaming service. The data collected is available in milliseconds to enable real-time analytics use cases such as real-time dashboards.
- Data will be store in Infulx DB which is fast, high-availability storage and retrieval of time series data in fields such as operations monitoring, application metrics, Internet of Things sensor data, and real time analytics.
- This data can be use for further analysis and turning to automated equipment of smart farming. Using technology, they can plant, water, maintain and harvest crops with the highest efficiency, which helps to improve the use of land, resources and time.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	User interacts with this application through the mobile app	MIT App Inventor
2.	Application Logic-1	Logic for a process in the application is to monitor the climatic conditions using sensor	Python
3.	Application Logic-2	Logic for a process in the application is to maintain the quality and moisture of soil	IBM Watson STT service
4.	Application Logic-3	Logic for a process in the application is to store the regular database of crops in cloud	IBM Watson Assistant
5.	Database	Database Type	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
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 is to get weather information	IBM Weather API
9.	External API-2	Purpose of External API used in the application for login purpose	Aadhar API

10.	IoT Gateway device	Purpose of IoT Gateway device is to monitor and maintain the records	GPS and sensors
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, IBM Cloud, Firebase

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Node Red, MIT App Inventor, Arduino IDE Node Red for connecting with application, MIT App Inventor for building app, Arduino is open source electronics platform to build hardware and software	Node Red, MIT App Inventor, Arduino IDE
2.	Security Implementations	HTTPS Connections, X-Force Red IoT Testing	Encryptions
3.	Scalable Architecture	Architecture is scalable from 10 devices to 300 devices easily and account is also scalable upto thousand connections. For very high scalability we need to upgrade our cloud plan.	Firebase, IBM Cloud
4.	Availability	Availability of our application is 24/7 because which use a cloud technology. Firebase will use commercially reasonable efforts to make Firebase available with a Monthly Uptime Percentage of at least 99.95% and distributed servers	Firebase, IBM Cloud
5.	Performance	No of requests is 2 requests per 20 seconds or 4 requests per 30 second and sometimes user request will be added with respective to the request.	MIT App Inventor, Node Red, Cloud