***WIRLESS NETWORK ARCHITECTURE***

***FOR MONITORS A NURSERY***

* Designing a wireless architecture to monitor a nursery involves selecting appropriate components that ensure reliable data collection, transmission, and analysis.

**System Architecture**

1. **Data Collection Layer**:
   * **Sensors** placed around the nursery collect data on environmental conditions and soil properties.
2. **Data Transmission Layer**:
   * Sensors transmit data wirelessly to nearby **microcontrollers** equipped with communication modules (e.g., Wi-Fi, LoRa, Zigbee).
3. **Edge Processing Layer**:
   * **Microcontrollers** or **edge devices** perform initial data processing and aggregation.
   * **Gateways** collect data from multiple sensors and ensure reliable transmission to the cloud.
4. **Data Aggregation and Cloud Layer**:
   * Data is transmitted from gateways to a **cloud platform** using secure protocols (e.g., MQTT, HTTPS).
   * The cloud platform stores, processes, and analyzes the data.
5. **User Interface Layer**:
   * **Web dashboards** and **mobile applications** provide real-time monitoring, alerts, and historical data visualization.
   * Users can set thresholds for alerts (e.g., low soil moisture, high temperature) and receive notifications.

**COMPONENTS USED**

1. **Sensors**:
   * Soil Moisture Sensors: Installed in the soil of various plant beds.
   * Temperature and Humidity Sensors: Placed at different heights to monitor air conditions.
   * Light Sensors: Positioned to measure light exposure in different areas.
2. **Microcontrollers**:
   * ESP32 boards are used for their Wi-Fi capabilities and processing power.
   * Each ESP32 is connected to multiple sensors and sends data to a central gateway.
3. **Gateway**:
   * A Raspberry Pi collects data from all ESP32 nodes via Wi-Fi.
   * The Raspberry Pi processes the data and forwards it to a cloud platform using MQTT.
4. **Cloud Platform**:
   * AWS IoT for device management, data storage, and analytics.
   * DynamoDB for storing sensor data.
5. **User Interface**:
   * A web application built using React.js for real-time monitoring and control.
   * A mobile app developed using Flutter for on-the-go access.
6. **Power Supply**:
   * Sensors and ESP32 nodes powered by rechargeable batteries with small solar panels for continuous power.

* This wireless architecture provides a comprehensive solution for monitoring a nursery, ensuring real-time data collection, transmission, and analysis. It leverages IoT technology to maintain optimal growing conditions, ultimately enhancing plant health and productivity.