

Problem Statement 3: Real-Time Data Experience with Fluvio

# GREENHOUSE AGRI FARMING MONITORING

**Submitted by (Solo Performer):**

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# INTRODUCTION

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## **Introduction:**

A smart greenhouse system that simulates real-time monitoring and control using IoT, Fluvio, PyQt5, and Flask.

## **Problem Statement:**

Traditional greenhouses suffer from inefficient manual monitoring. This project provides a smart system for automated real-time environmental control.

## **Scope:**

The system simulates sensor readings for temperature, humidity, CO<sub>2</sub>, soil moisture, water level, and rainfall, alongside device controls for lights, fans, pumps, and ACs. The solution is intended for educational, prototype, and simulation purposes and can be extended for real hardware integration.

# SYSTEM ARCHITECTURE

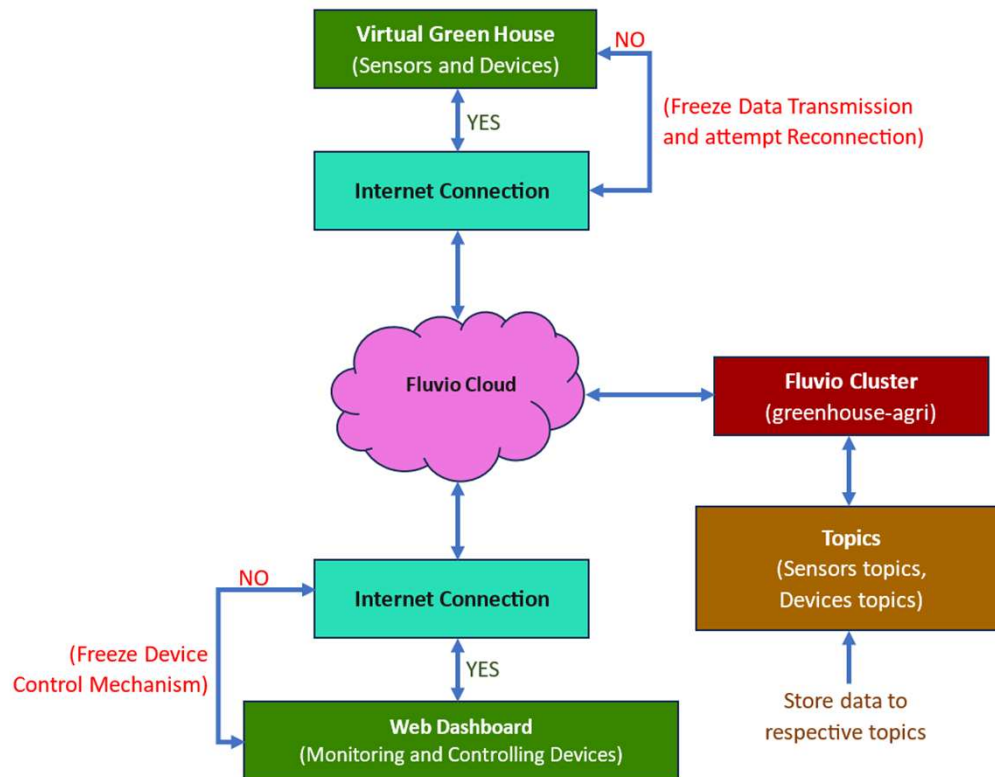


Fig.: High-Level System Architecture

## Technology Stack:

- **Languages:** Python (Flask, PyQt5)
- **Web:** HTML, CSS, JavaScript, Chart.js
- **Streaming:** Fluvio (event-driven messaging and SmartModules)
- **Others:** Threads, Subprocess, Pytz (for timezone handling)

# HOW TO RUN THE PROJECT

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## Requirements:

- Linux OS
- Python 3.12 or higher
- Flask, and necessary library from requirements.txt  
*sudo pip3 install -r requirements.txt --break-system-packages*
- Follow the instructions from readme or from the documentation.
- Links:
  - [AanandPandit/hackhazards25\\_green-house-agri-farming](#)
  - [https://youtu.be/ubT7Vlt\\_fJ4](https://youtu.be/ubT7Vlt_fJ4)

# RESULTS AND OUTPUT

The image displays a Smart Greenhouse Monitoring System interface, likely running on a Raspberry Pi or similar device. The interface is divided into several sections:

- Smart Greenhouse Dashboard:** Shows the system status as "Online" and the last cloud time as "14:11:15". It also displays the system time as "4/21/2025, 2:11:18 PM".
- Device Control:** A section with various toggle switches for controlling the greenhouse environment. The controls include:
  - Fan 1 (Off), Fan 2 (On), Fan 3 (Off), Fan 4 (On), Fan 5 (On)
  - Ac 1 (On), Ac 2 (Off)
  - Humidifier 1 (On), Humidifier 2 (On), Humidifier 3 (On)
  - Light 1 (On), Light 2 (On), Light 3 (On), Light 4 (On), Light 5 (On)
  - Water Pump (On)
- Virtual Greenhouse Monitoring Dashboard:** A section displaying real-time sensor data and status indicators for various components:
  - Temperature: 26.03 °C
  - Humidity: 61.84 %
  - CO2: 368.81 ppm
  - Rain Sensor: 44.42 %
  - Soil Moisture 1: 64.0 %
  - Soil Moisture 2: 58.63 %
  - Water Tank: 25.56 %Below the sensor data, there are status indicators for each component:
  - Fan 1: OFF, Fan 2: ON, Fan 3: OFF, Fan 4: ON, Fan 5: ON
  - Light 1: ON, Light 2: ON, Light 3: ON, Light 4: ON, Light 5: ON
  - AC 1: ON, AC 2: OFF
  - Humidifier 1: ON, Humidifier 2: ON, Humidifier 3: ON
  - Water Pump: ON
- Terminal Output:** A section showing the command-line interface of the system. It displays the output of a Python script, including error messages and sensor data. The output shows that the system is running successfully, with some minor errors related to the Qt library and the Rain Sensor.

# RESULTS AND OUTPUT

