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# **ClimatePulse: Local Voices, Smarter Forecasts for Farmers**

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## **Team Members:**

<b>Name</b>	<b>Role</b>	<b>College Name</b>
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**Hackathon:** Vultr Cloud Innovate Hackathon

**Date:** 25-09-2024



# ClimatePulse - Round 2 Project Submission PDF

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## 1. Project Plan (1-2 pages)

### Project Objectives

- **Goal:** To create an intuitive platform for farmers to share local weather observations, improving agricultural decision-making by providing more localized and accurate weather forecasts.
- **Problem Solved:** The platform addresses unpredictable weather, lack of localized data, limited community interaction, and resource management challenges in farming.
- **Impact:** Empower farmers with reliable weather data, improve crop management, and promote sustainable farming practices.

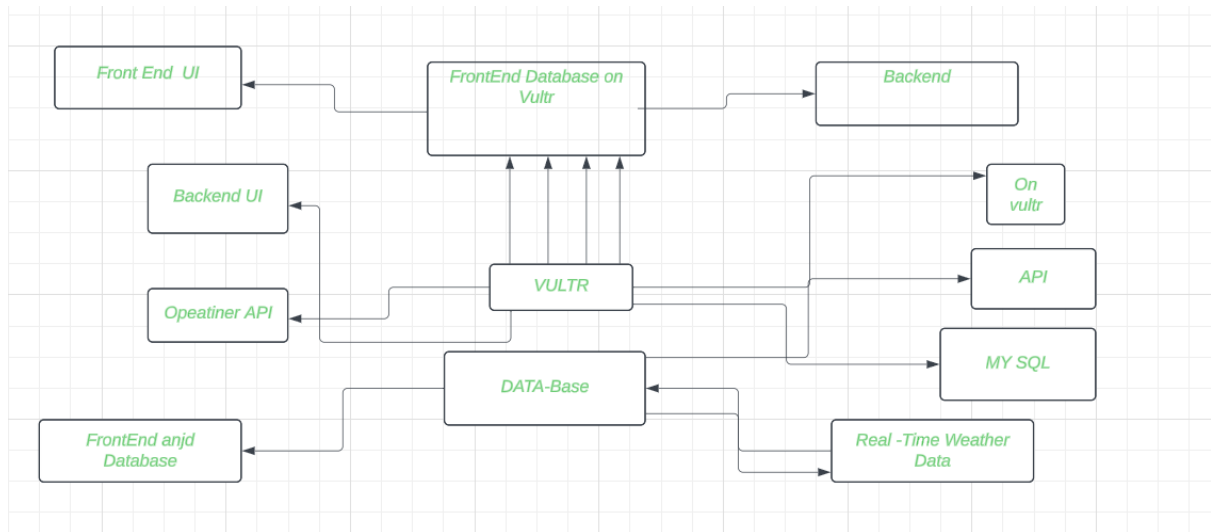
### Timeline and Milestones

1. **Week 1-2:** Research and Requirements Gathering
  - Understand the problem in depth, finalize requirements, and plan the platform's core features.
2. **Week 3-4:** Development Phase (Using Bubble, Vultr, and MySQL)
  - Set up platform on Vultr, connect MySQL database, and integrate weather reporting features.
3. **Week 5:** Testing and Deployment
  - Test platform's functionality, fix bugs, and deploy the first working version for initial feedback.
4. **Week 6:** Final Submission Preparation
  - Complete documentation, prepare codebase, and submit the project.

### Deliverables

- Fully functioning ClimatePulse platform with weather reporting and data aggregation.
  - Database integration with MySQL hosted on Vultr.
  - User-facing dashboard displaying localized weather insights.
  - Complete technical documentation.
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## 2. Architecture Diagrams (1-2 pages)



### High-Level Architecture Diagram

- **Frontend:** Bubble (No-code platform for UI and workflows).
- **Backend:** MySQL database hosted on Vultr.
- **API Integration:** OpenWeather API for weather data.
- **Data Flow:** Farmers input weather data, which is saved to the database. Data is processed for generating forecasts.

### Component Diagram

- **Bubble Frontend:** Handles UI/UX, user authentication, and dashboard.
- **Vultr Hosting:** Cloud infrastructure to support the backend and database.
- **MySQL Database:** Stores weather data, user info, and aggregated data.
- **OpenWeather API:** Provides real-time weather data for forecasts.

### Network Topology (if applicable)

- Data flows from the frontend (Bubble) to the backend (Vultr MySQL).
  - API calls to external weather services (OpenWeather).
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## 3. Technical Documentation (2-3 pages)

## System Architecture

- **Bubble:** A no-code platform used for building the UI and handling user workflows.
- **MySQL Database:** Stores weather data, user information, and aggregated reports.
- **Vultr Cloud:** Cloud infrastructure that ensures the application's scalability and performance.
- **OpenWeather API:** Used for fetching weather data based on users' geographic location.

## Key Components and Modules

- **User Authentication:** Login system connected to the MySQL database.
- **Weather Reporting:** Allows farmers to input weather data (e.g., temperature, humidity).
- **Dashboard:** Displays weather reports and aggregated data to users.
- **API Integration:** Retrieves current weather forecasts and reports from the OpenWeather API.

## API Documentation

- **OpenWeather API:**
  - **Endpoint:**  
`https://api.openweathermap.org/data/2.5/weather?lat={latitude}&lon={longitude}&appid={api_key}`
  - **Response:** JSON data containing weather parameters (e.g., temperature, humidity, wind speed).

## Setup and Usage Instructions

- **Deploy on Vultr:**
    - Set up a Vultr account and deploy the MySQL instance.
    - Set up your database to store weather data.
  - **Configure Bubble:**
    - Build the frontend using Bubble's drag-and-drop interface.
    - Set up API connections (for weather data) and workflows (for user input and data storage).
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## 4. Prototype/Codebase (1 page)

## GitHub Repository Link

<https://github.com/krtannu/ClimatePulse.git>

## Codebase Details:

- **Source Code:** All relevant files for the platform's development.
  - **Build Instructions:** How to deploy and run the project (e.g., setting up MySQL on Vultr, Bubble workflows, and API integrations).
  - **Deployment Instructions:** How to set up Vultr and integrate MySQL with Bubble for full functionality.
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## 5. Conclusion & Future Work (Optional)

- **Challenges:**
  - Data validation and ensuring accurate weather reports.
  - Scalability concerns as more farmers join the platform.
  - Implementing advanced forecasting (yet to be done).
- **Future Work:**
  - **Collaborative Forecasting:** Develop algorithms for more accurate weather predictions using the collected data.
  - **Mobile App:** Extend the platform to a mobile version for better accessibility.