Smart Water Tank Level Detector and Auto-control System

1. Introduction

The aim of the project is to develop a smart system, which constantly monitors the water level in a tank. This system is automated in that the water pump (motor) is controlled to the particular levels of water in order to maintain supply without overflow. It also allows updating a building supervisor on the current status in real-time, using a smartphone and PC, and has safety notifications.

1 System Features

- **Automated Level Control:** The engine turns on upon water shortage and off upon its fullness.
- **Visual Indication:** The device has an LED indicator that will light up when the engine is performing its tasks.
- **Safety Alert System:** The system will have a siren to alert home members about critical events (e.g., the possibility of overflow, malfunction of the engine, etc.).
- **Remote Monitoring:** The status of the water tank could be controlled remotely by a Smartphone and a PC connected to the net.
- **Centralized IoT Management:** There will be a dedicated Registration Server to manage Network Topology & Architecture

2 Network Topology & Architecture

The network consists of three distinct logic zones as the network diagram below shows:

A. IoT Sensing and Control Unit (Yellow Zone)

This component manages the physical sensing/actuation.

MCU-PT (WaterLevelMonitor):	The central microcontroller that processes sensor data and controls actuators.
Water Sensor:	The sensor continually measures the water level in the tank.
LEDS (Motor Indicator):	The sensor displays water data to the supervisor; it glows in case of an incident (e.g. overflow).
Siren:	Provides an audio alert to Tables

Device Name	Interface	IP Address	Subnet Mask	Gateway
Registration Server	FastEthernet0	1.1.1.1	255.0.0.0	1.1.1.1
PC-PT (User End 1)	FastEthernet0	1.1.1.2	255.0.0.0	1.1.1.1
MCU (Water Monitor)	Wireless0	1.1.1.3	255.0.0.0	1.1.1.1

Table 1: Network Configuration Table

3 Principle of work and logic

The logic of the system is based on Python on the MCU. The control flow is designed as follows:

Monitoring:
The Water Sensor measures the analog water level and sends a signal to the Registration Server (1.1.1.1).

Low Level Logic ($< 30\%$):
In case water level decreases below 30, the MCU sends a signal to the Access Point to turn ON the motor as well as to display the current state by the IoT Web Monitor (through browser at 1.1.1.1).

High Level Logic ($> 90\%$):
In case the water level is below 90, the MCU sends a

4 Conclusion

This simulation has been effective in illustrating a scalable solution of Smart Water Tank. With the help of the IoT capabilities of Cisco Packet Tracer, the system offers an effective and automated system of water management, which will decrease the wastage of water and guarantee the regular supply of it.