

## **CHAPTER 4**

### **ANALYSIS AND DESIGN**

#### **4.1 Analysis**

In this project the microcontroller used is Arduino UNO as the control center of other devices. The project uses several devices used including Ethernet shield W5100, YF-S201 water flow sensor, water pump machine, two water level sensors, rain sensor, two IR obstacle sensors, 5v relays, and Servo SG90. The water flow sensor YF-S201 is used to calculate the water discharge that has been used in milliliters. The water pumping machine is used to pump water from a water storage container in accordance with the order of 2 water level sensors at the upper and lower limits of the water. The rain sensor is used for knowing and notifying that the water pump machine is on or off. Two IR obstacle sensors each have functions, the first obstacle IR sensor is used to notify that the gate is open or closed, and the second IR obstacle sensor is used to notify that the SG90 servo is working or not. Servo SG90 is used to lock the gate following commands from the user. All notices and commands can be accessed through the Domoticz framework.

## 4.2 Desain

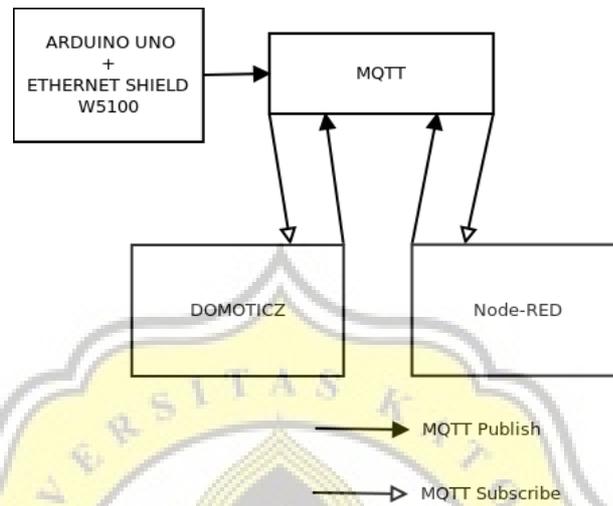


Illustration 4.1: Diagram Sistem

In this diagram showing the system running on this project, arduino UNO and Ethernet Shield devices will publish against MQTT. Domoticz and Node-RED will be publish to MQTT. And MQTT will subscribe to two framework Domoticz and Node-RED.

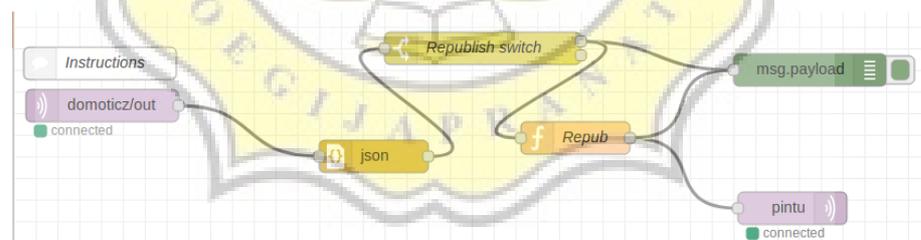


Illustration 4.2: Flowchart Node-RED

In this flowchart shows the relationship from MQTT to Node-RED which serves to give commands from Domoticz and read by Node-RED and the microcontroller will run the command.

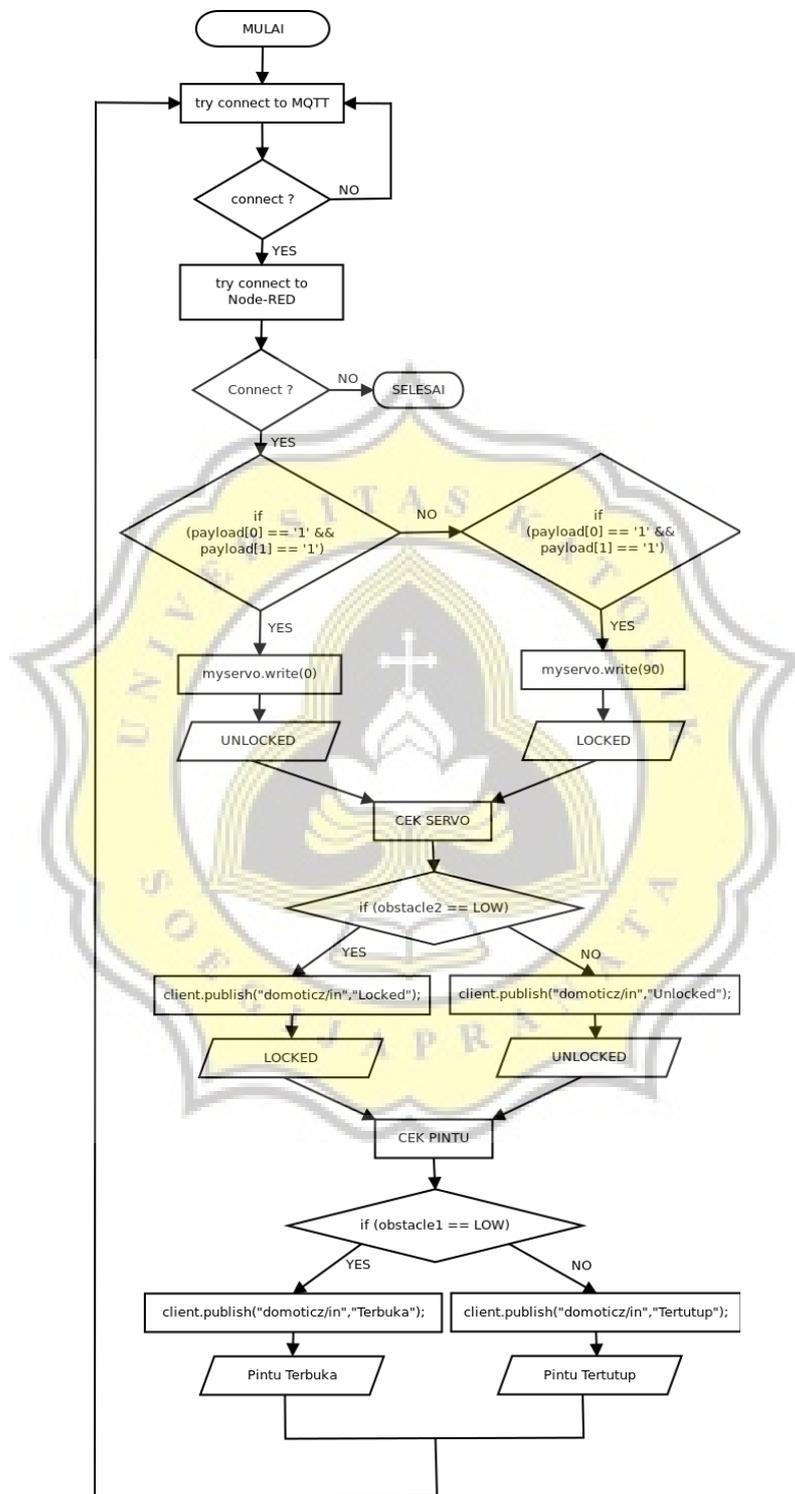


Illustration 4.3: Flowchart Pintu

The first program run by arduino and ethernet shield is connecting to MQTT and connecting to Node-RED. Node-RED and MQTT are used for mutual publish and subscribe. Once connected domoticz will give the command to run servo that serves to lock the gate, program keep running to give notice that servo has been properly working that can be monitored at Domoticz. In addition to notification for the infrared servo sensor will also read that the gate is open or closed.



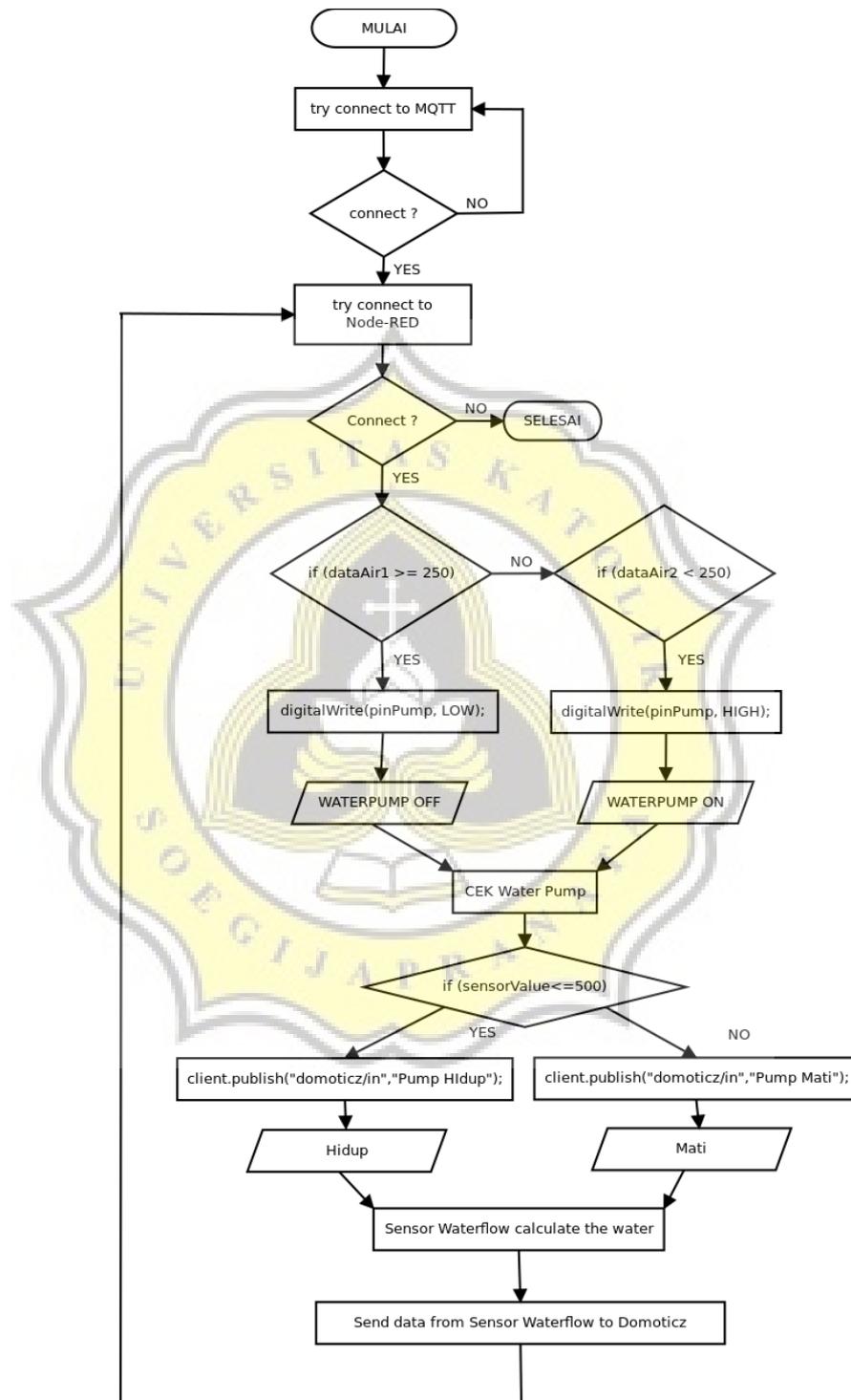


Illustration 4.4: Flowchart Tandon

The first program run by arduino and ethernet shield is connecting to MQTT and connecting to Node-RED. Node-RED and MQTT are used for mutual publish and subscribe. Once connected, the water level sensor if  $\text{dataair1} > 250$  then the water pump machine will die and if  $\text{dataair2} < 250$  then the water pump machine will live. The program runs continuously to send notifications via rain sensor which can be monitored through domoticz and waterflow sensor will work if water is used, water flow will read and process data readable and water debit that has been processed can be monitored through Domoticz.

