Project Title:Intelligent Water Distribution & Monitoring System

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1. INTRODUCTION

The project Intelligent water distribution system, as the name says it is all about management of water supply throughout the scale, right from small societies, townships to entire urban infrastructure and also for irrigation water supply management.

1.1 Overview

Main task of the water distribution system is to maintain the water in the tank and also generate the water bills to the individual households which involves human efforts. This system can be automated using the Internet of things.

1.2 Purpose:

The purpose of this system is to automate the water distribution and monitoring system through IoT Platofrm.

2. LITERATURE SURVEY

2.1 Existing System

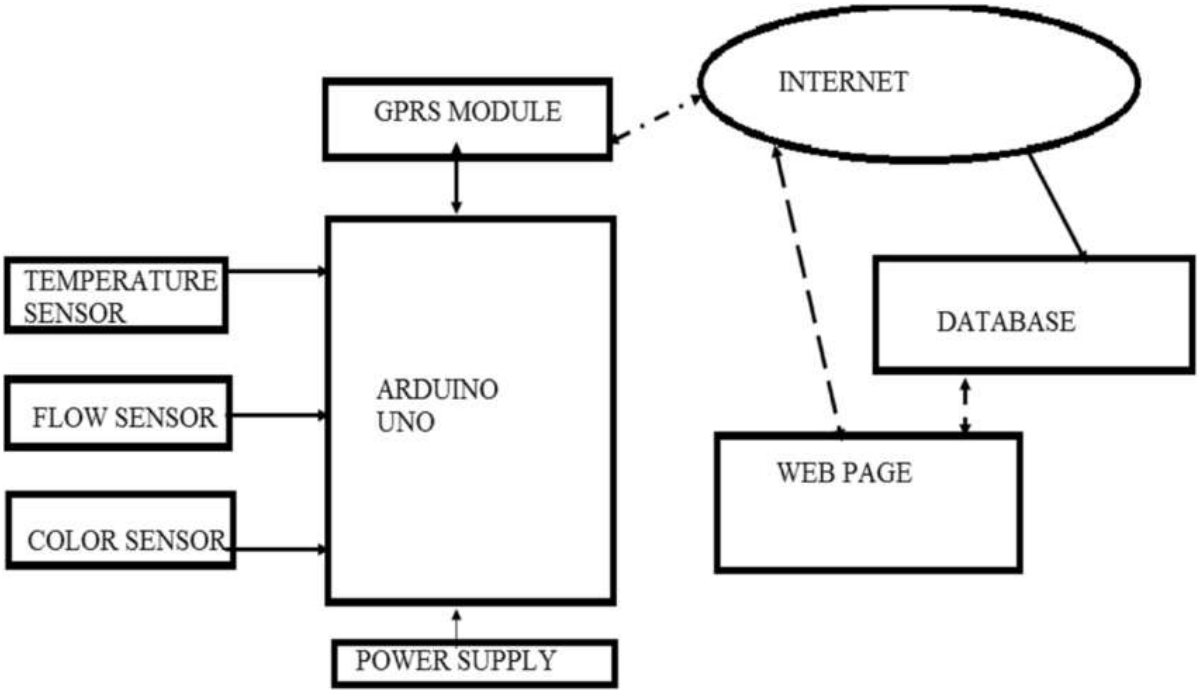
In this survey, we look at the need of IoT in smart water system. In the first step, a basic architecture is selected and applied in WDS by analysing and comparing different technologies, equipment, cost and methods to build a smart water system. It reveals the need for an IoT architecture with technologies combined for water distribution system. It also takes into account of its advantages and disadvantages based on the literature review. The selection of the best choice can be identified for smart water system at the end of this step. The next step involves selection of the parameters required using IoT for water distribution. At this step, the current issues during the selection of parameters and some suitable suggestions are provided. Finally, an overview of the benefits which is necessary to implement IoT in smart water system is discussed

2.1 Proposed solution

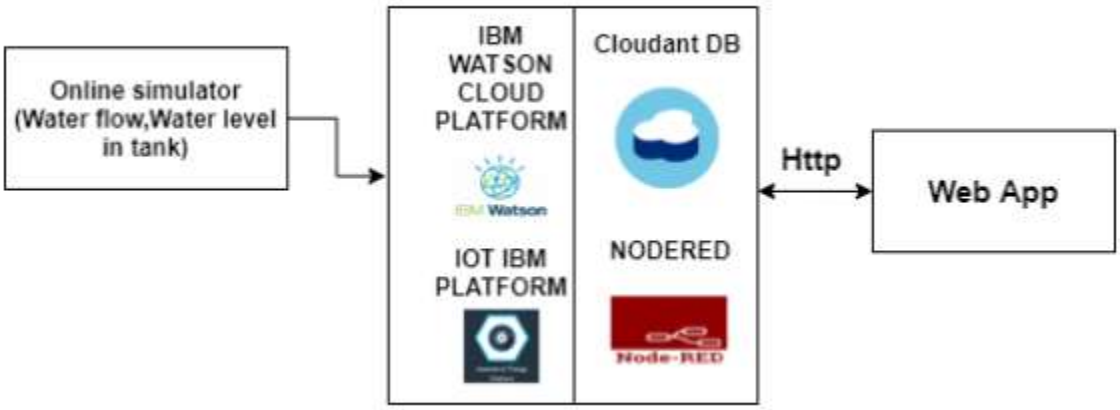
The proposed system should continuously monitor the main tank water level and should automatically switch on/off the motors according to the tank water level and alert the admins.it should monitor the water flow of the individual houses and store the flow rate of each in the Cloudant DB to generate the water bills. Tank water level and the bills should be visualized in the dashboard so that the Admin can monitor them.

3. THEORITICAL ANALYSIS

3.1 Block diagram



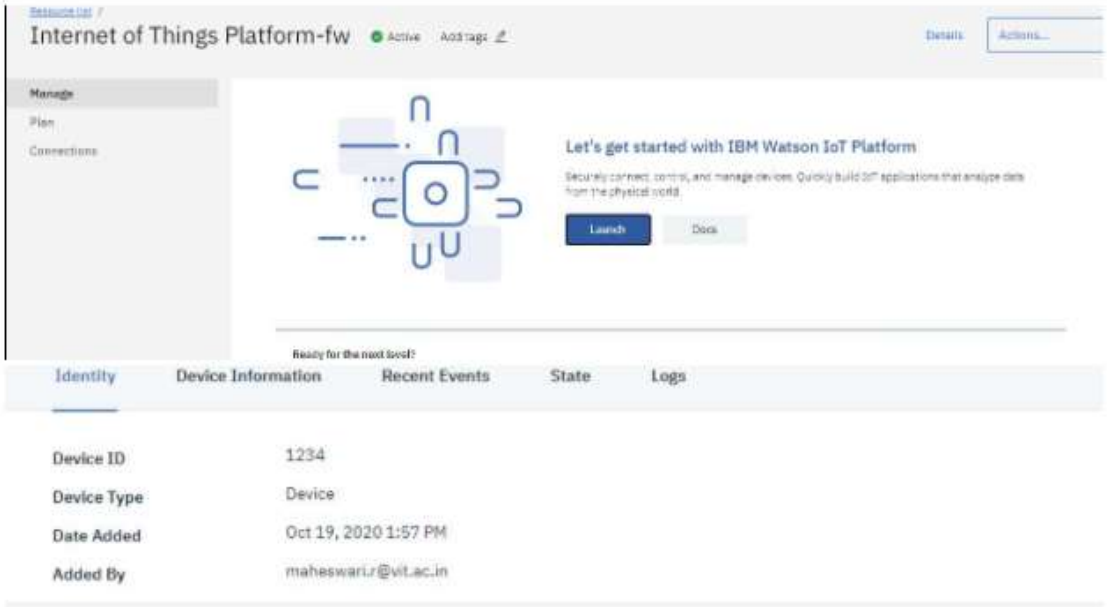
3.2 Proposed Technical Architecture



4. EXPERIMENTAL INVESTIGATIONS

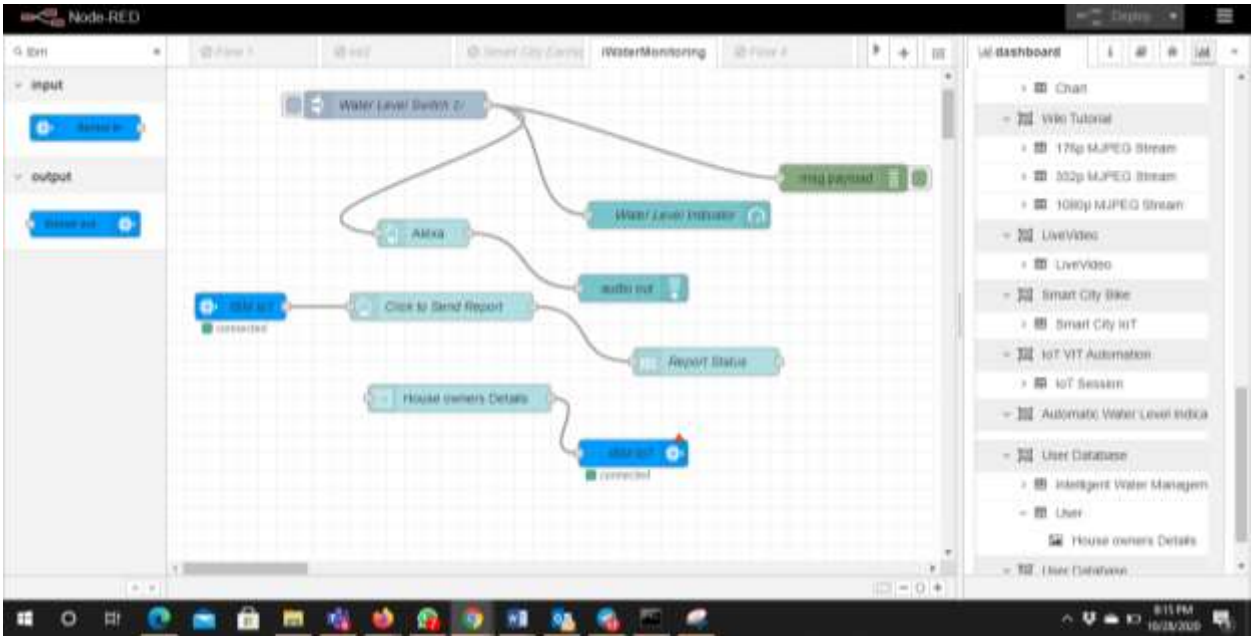
Solution :Project Report

1. IBM IoT Platform and device setup



2. Nodered set up configuration

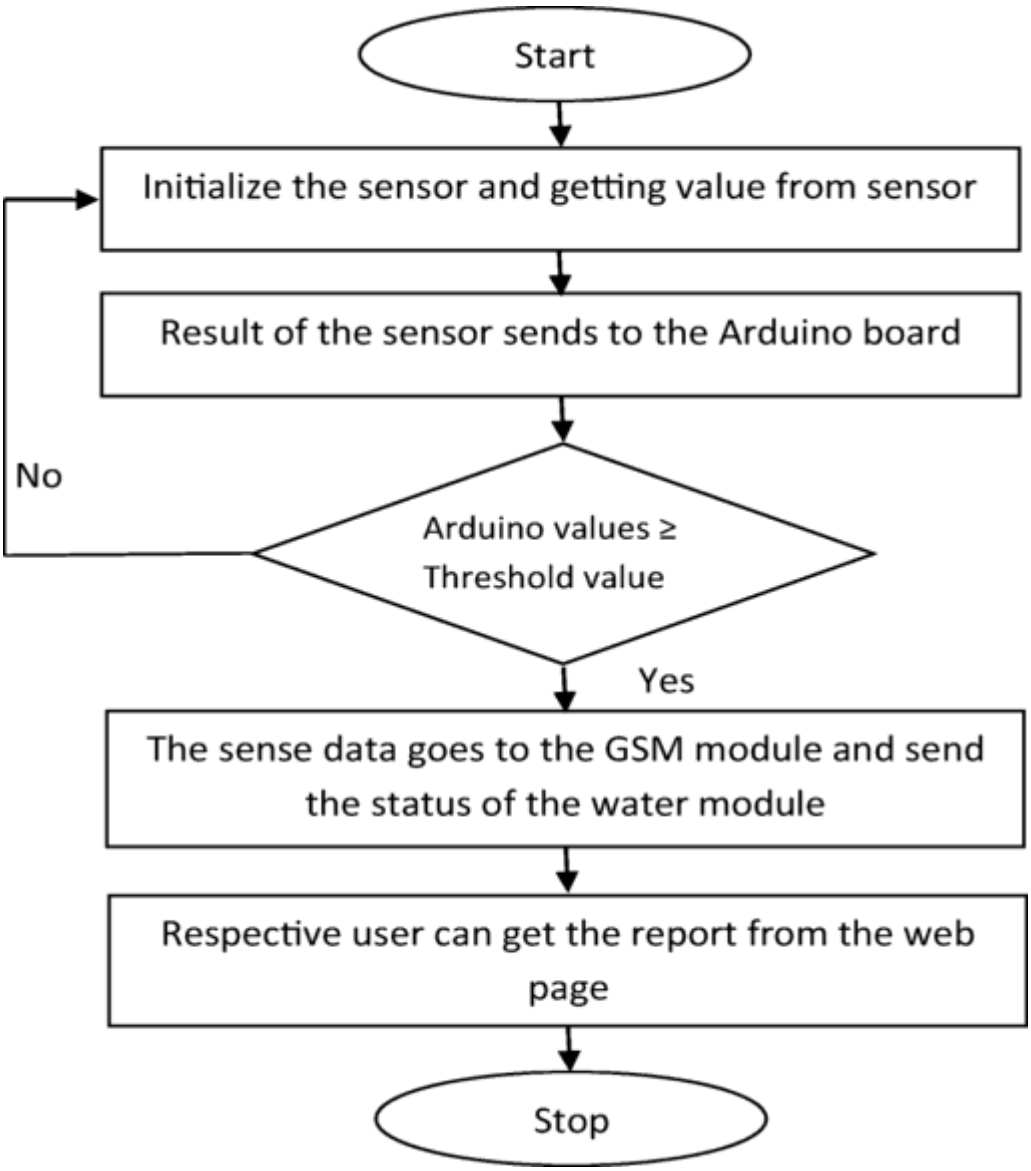
3. Creation of Node red flow



4. FLOWCHART

Project Flow:

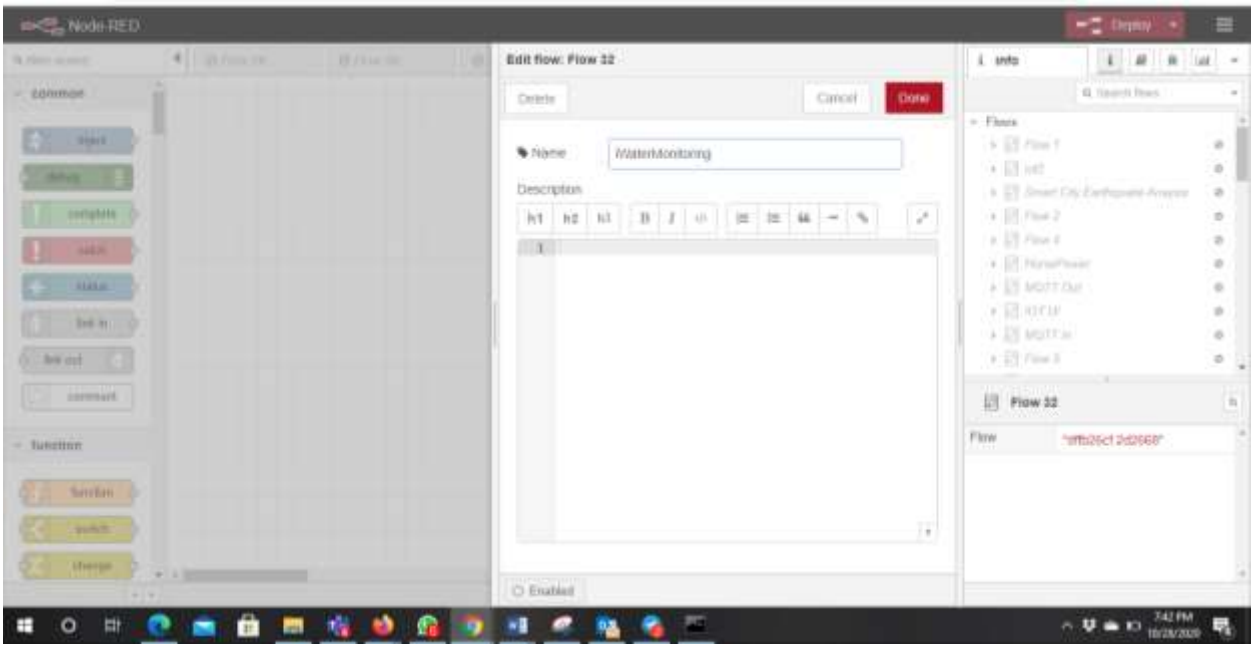
- Main tank water level and Water flow to individual houses is continuously updated to IBM IoT platform (Use Online simulator sensor for water flow and water level)
- Create a Node-RED flow to get the data from IBM IoT platform and store it in cloudant DB.
- Display the tank water level in the UI
- Retrieve the flowrate of individual houses and generate bills and display them in UI.


Start
Initialize the sensor and getting value from sensor
Result of the sensor sends to the Arduino board
No
Arduino values ≥
Threshold value
Yes
The sense data goes to the GSM module and send the status of the water module
Respective user can get the report from the web page
Stop

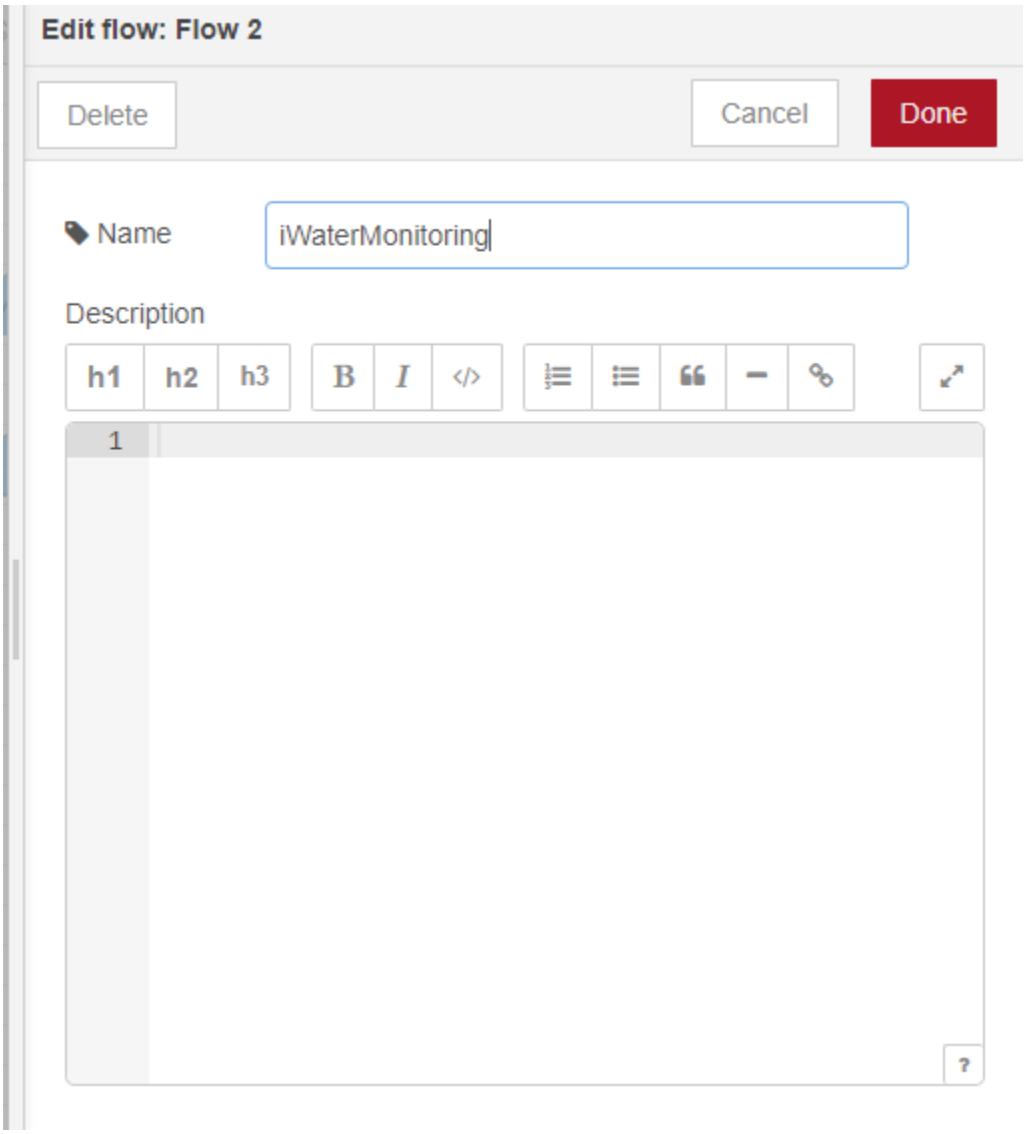
5. RESULT

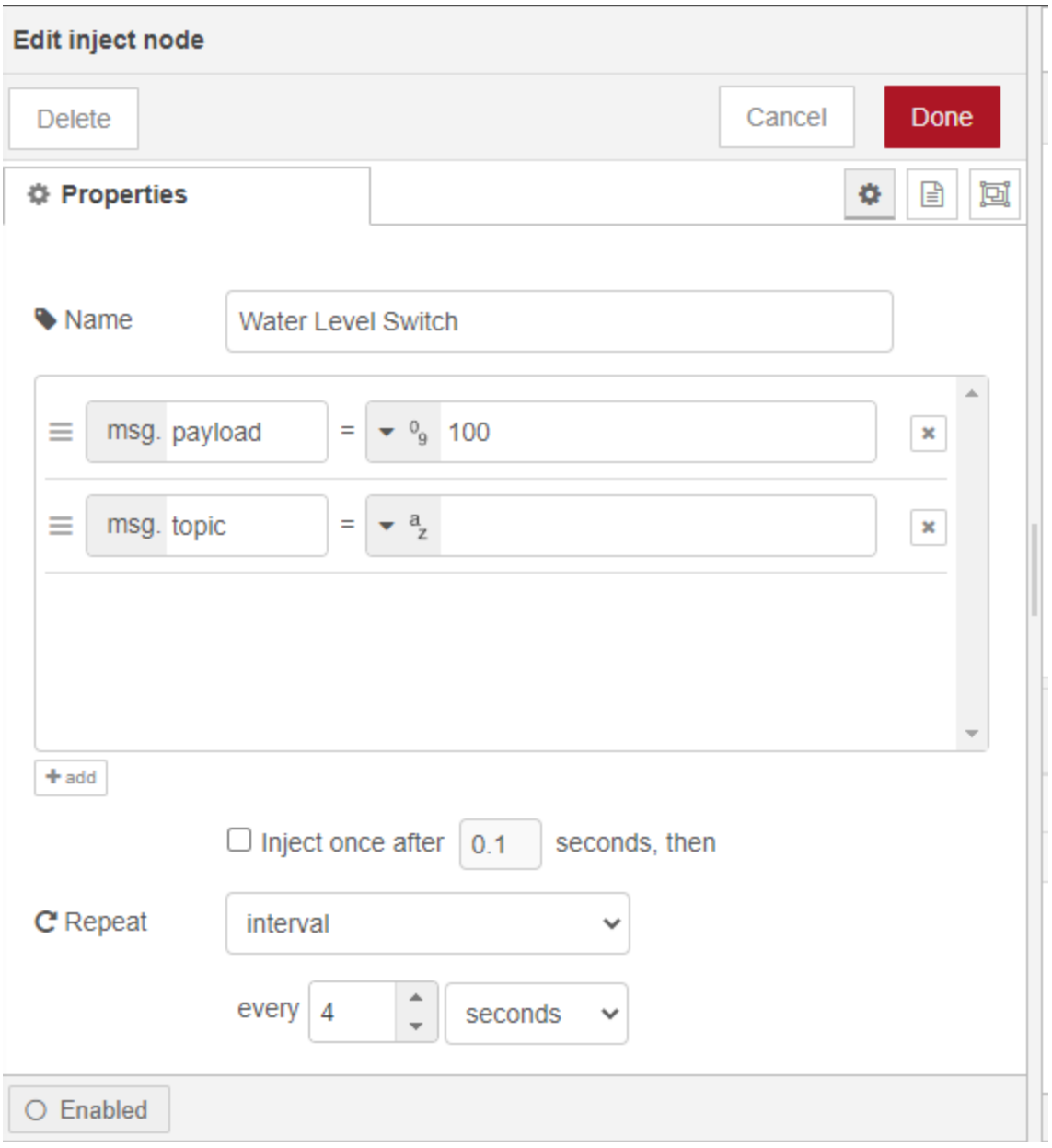
Dashboard UI display

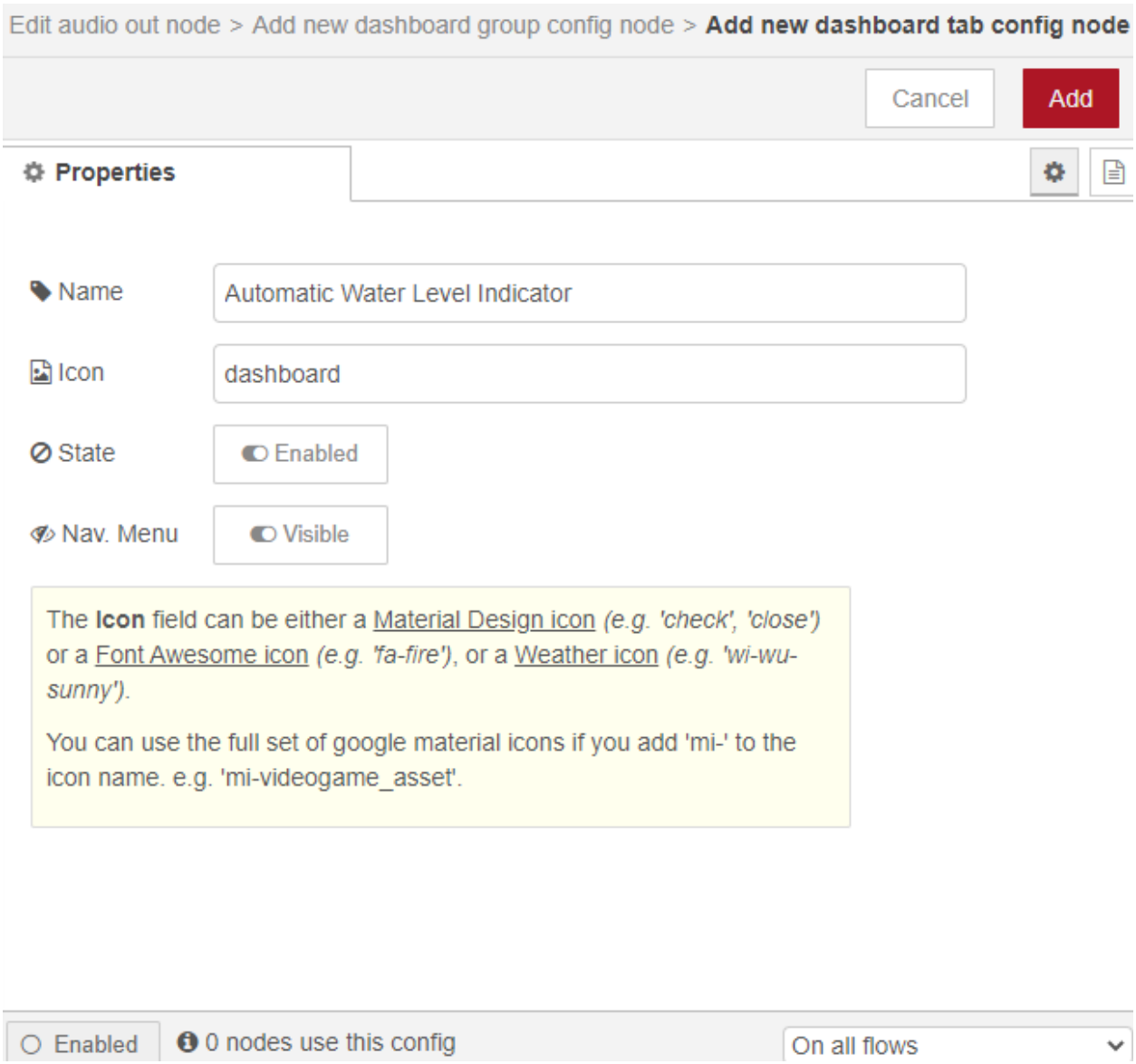
Node red flow : Node configuration

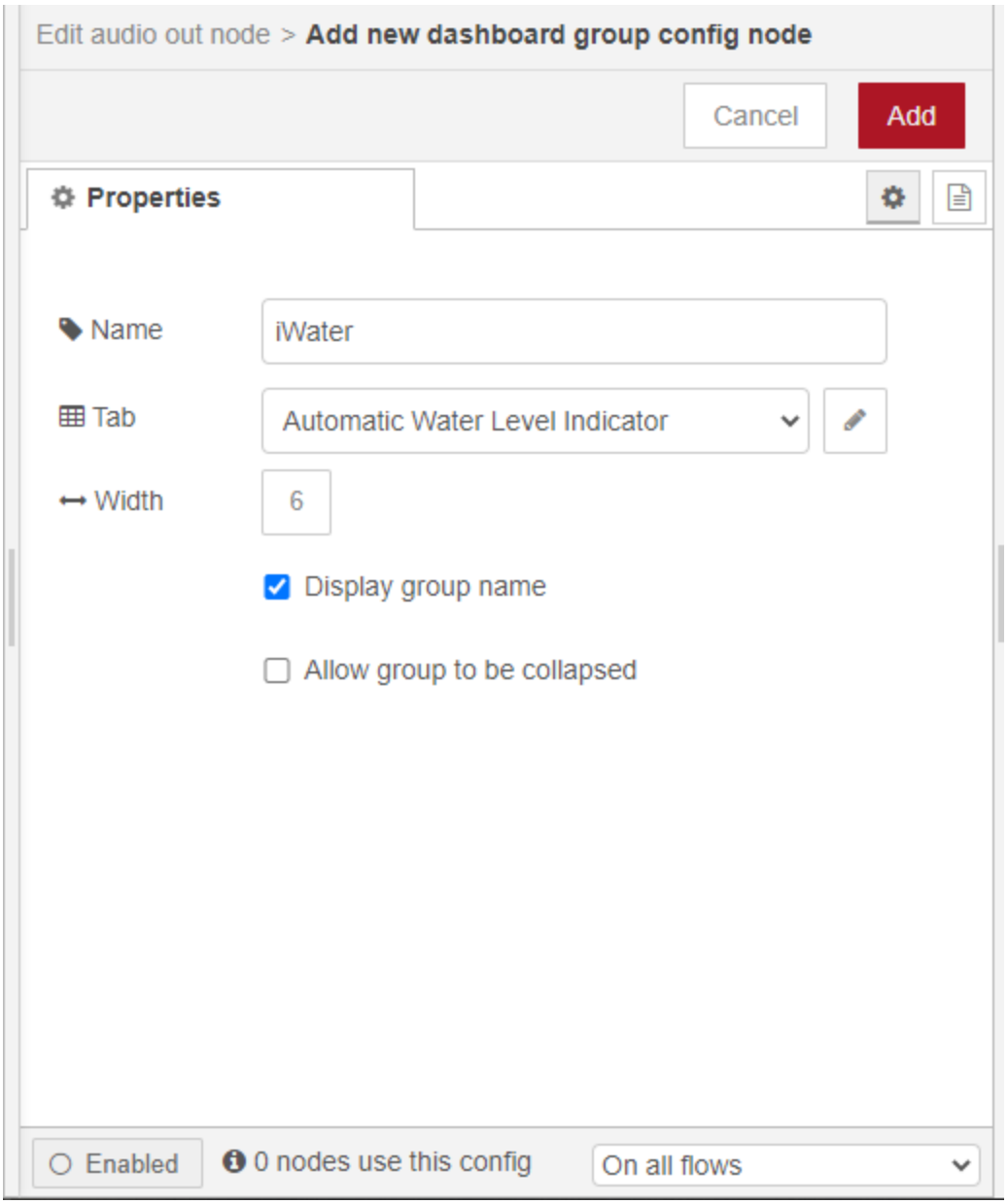


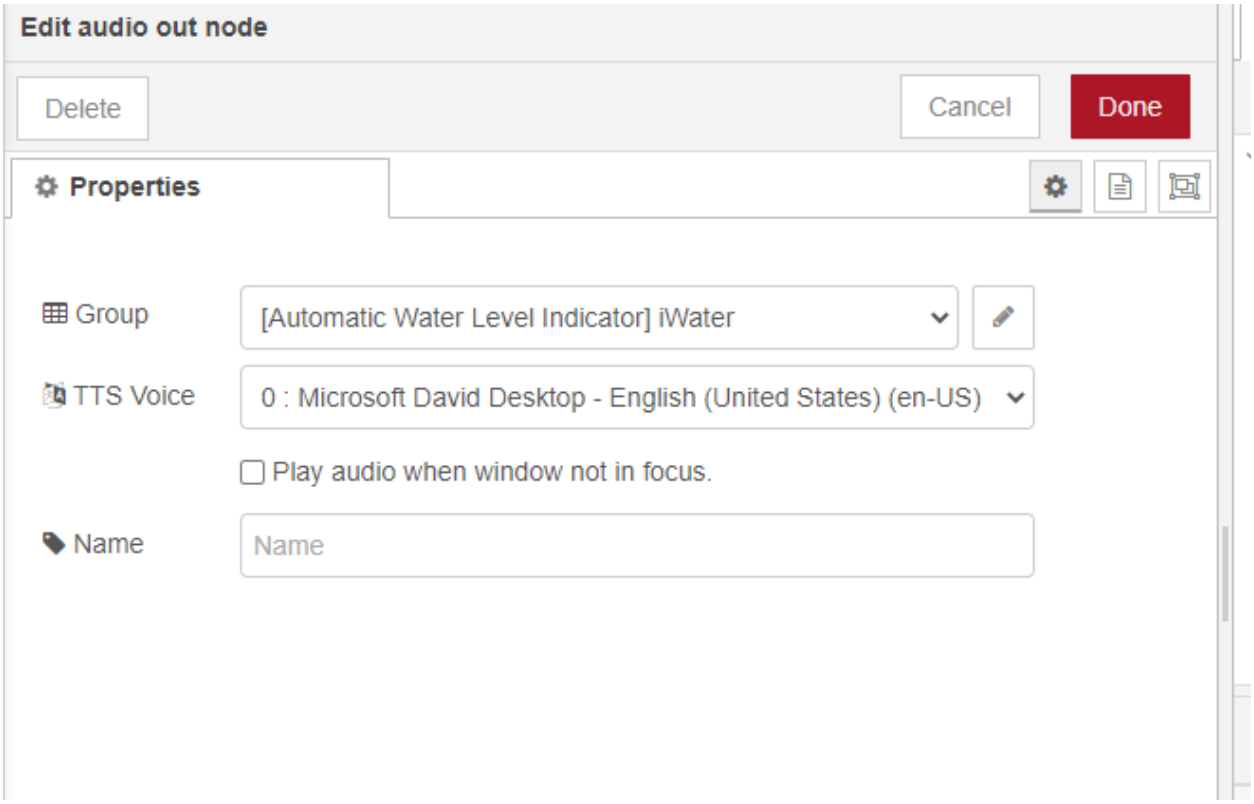
Properties Setting:

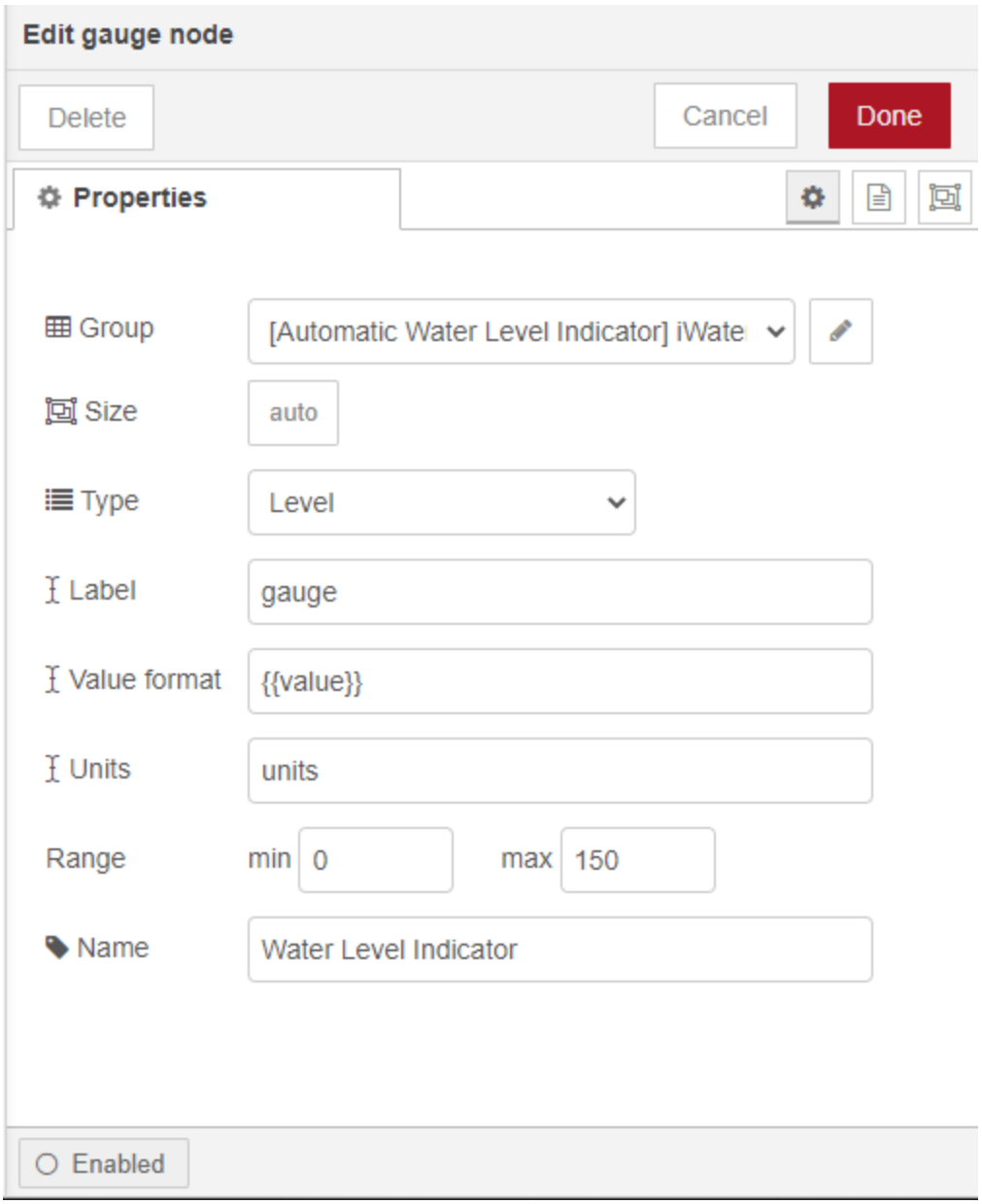


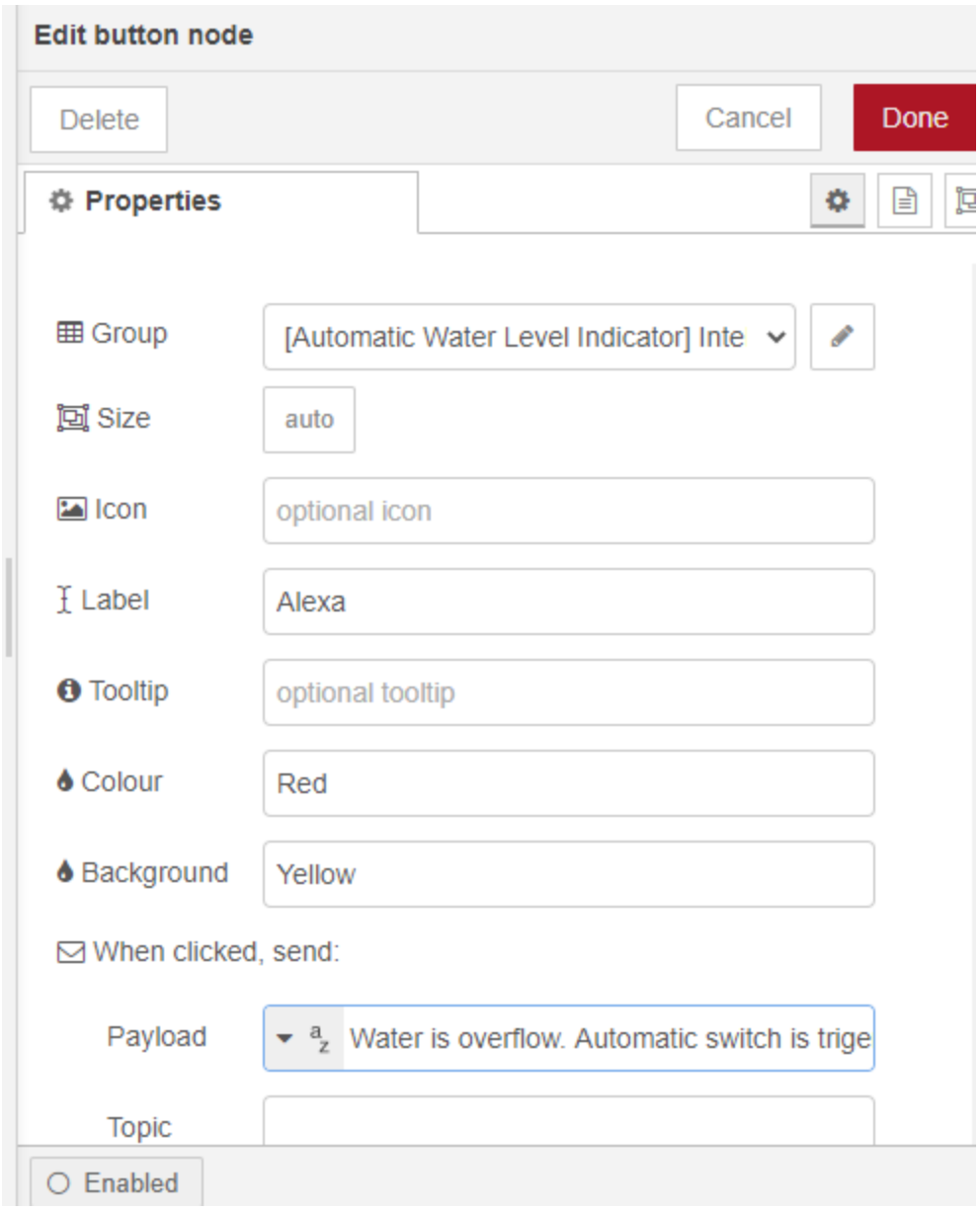

Edit inject node
Delete
Cancel
Done
Properties
Name
Water Level Switch
msg. payload
=
100
msg. topic
=
add
Inject once after
0.1
seconds, then
Repeat
interval
every
4
seconds
Enabled

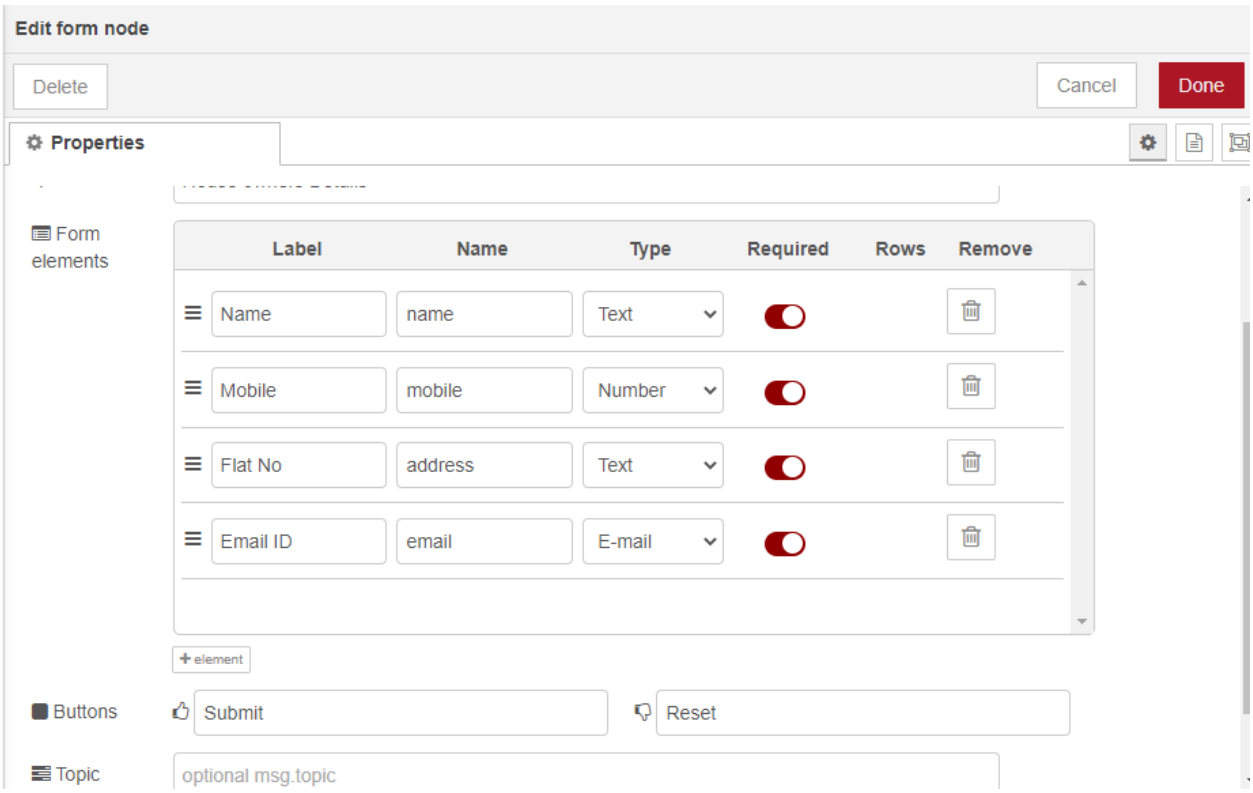

Edit audio out node > Add new dashboard group config node > Add new dashboard tab config node
Cancel
Add
Properties
Name
Automatic Water Level Indicator
Icon
dashboard
State
Enabled
Nav. Menu
Visible
The Icon field can be either a Material Design icon (e.g. 'check', 'close') or a Font Awesome icon (e.g. 'fa-fire'), or a Weather icon (e.g. 'wi-wu-sunny').
You can use the full set of google material icons if you add 'mi-' to the icon name. e.g. 'mi-videogame_asset'.
Enabled
0 nodes use this config
On all flows


Edit audio out node > Add new dashboard group config node
Cancel
Add
Properties
Name
iWater
Tab
Automatic Water Level Indicator
Width
6
Display group name
Allow group to be collapsed
Enabled
0 nodes use this config
On all flows


Edit audio out node
Delete
Cancel
Done
Properties
Group
[Automatic Water Level Indicator] iWater
TTS Voice
0 : Microsoft David Desktop - English (United States) (en-US)
Play audio when window not in focus.
Name
Name


Edit gauge node
Delete
Cancel
Done
Properties
Group
[Automatic Water Level Indicator] iWate
Size
auto
Type
Level
Label
gauge
Value format
{{value}}
Units
units
Range
min
0
max
150
Name
Water Level Indicator
Enabled


Edit button node
Delete
Cancel
Done
Properties
Group
[Automatic Water Level Indicator] Inte
Size
auto
Icon
optional icon
Label
Alexa
Tooltip
optional tooltip
Colour
Red
Background
Yellow
When clicked, send:
Payload
Water is overflow. Automatic switch is trige
Topic
Enabled



6. **ADVANTAGES :**
    1. **Water is preserved**
    2. **Wastage of water is reduced**

7. **DISADVANTAGES**
    1. If the sensor is failed to work, wastage of water will happen
8. **CONCLUSION**

    Thus a system is designed for monitoring Main tank water level and Water flow to individual houses is continuously updated to IBM IoT platform Using Online simulator sensor for water flow and water level.
9. **FUTURE SCOPE**
    a. **Every gated community is planning for deploying such automation to preserve water for future generation.**
10. **BIBILOGRAPHY**

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3. M. Jurian, C. Panait, V. Daniel, C. Bogdan, “Monitoring drinking water quality and wireless transmission of parameters”, Proc IEEE International Spring Seminar on Electronics Technology, 12 Aug. 2010, doi: 10.1109/ISSE.2010.5547352.
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8. J. Wan, M. Huang, Y. Ma, W. Guo, Y. Wang, H. Zhang, W. Li, X. Sun, "Prediction of effluent quality of a paper mill wastewater treatment using an adaptive network-based fuzzy inference system", Applied Soft Computing, vol. 11, no. 3, pp. 3238-3246, 2011.
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10. S. K. Alshattnawi, “Smart Water Distribution Management System Architecture Based on Internet of Things and Cloud Computing”, IEEE International conference on new trends in computing sciences, pp. 289-294, 11 Jan. 2018.

Appendix

Sample Code:

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Flat
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