Intelligent Water Distribution & Monitoring System Report

Prepared by :

Nawres mougou

Nawresmougou274@gmail.com

2020/2021

1 . INTRODUCTION :

1.1 . Overview :

Water is one of the most important substance on earth. All plants and animals must have water to survive. If there was no water there would be no life on earth. ... Apart from drinking it to survive, people have many other uses for water, in that purpose i developed the solution of creating the **Intelligent Water Distribution & Monitoring System** which is my solution 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..The project Intelligent water distribution system, is all about management of water supplies throughout the scale, right from small societies, townships to entire urban infrastructure and also for irrigation water supply management, and from now on monitoring your water supplies is a push of a button away , so no more effort needed to manage the water tank level or to generate the bills thanks to my project.

1.2. Purpose:

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, water flow and the bills should be visualized in the dashboard so that the Admin can monitor them.

2 .LITERATURE SURVEY :

2.1.Existing Problem:

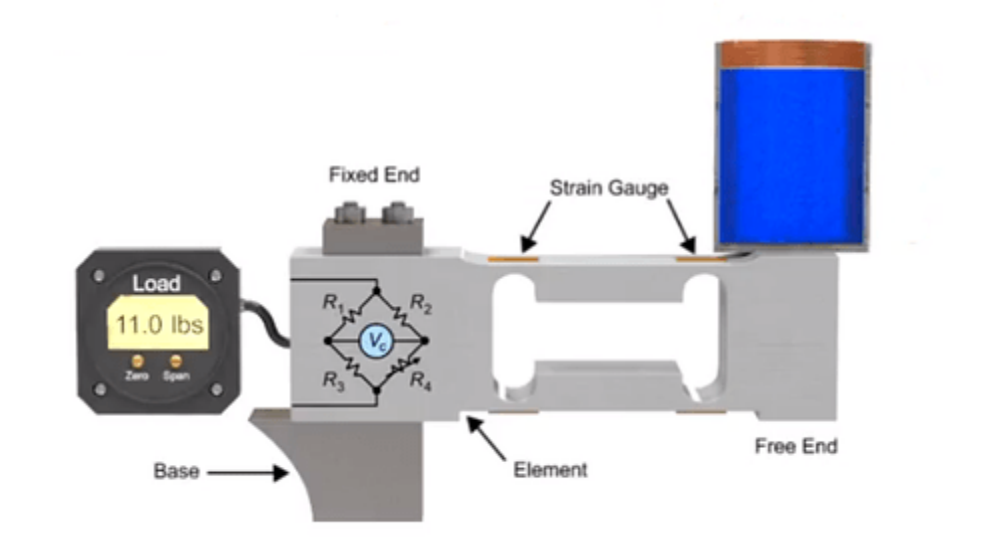
In order to solve this problem there is a lot of industrial devices , from the oldest to the newest , such as **the sight glass**, A manual approach to measurement, sight glasses have always had a number of limitations. The material used for its transparency can suffer catastrophic failure, with ensuing environmental insult, hazardous conditions for personnel, and/or fire and explosion...

Other level-detection devices include those based on specific gravity, the physical property most

commonly used to sense the level surface. A simple float having a specific gravity between those of the process fluid and the headspace vapor will float at the surface, accurately following its rises and falls. Hydrostatic head measurements have also been widely used to infer level.

We can also find **the Load Cells**. A load cell or strain gauge device is essentially a mechanical support member or bracket equipped with one or more sensors that detect small distortions in the support member. As the force on the load cell changes, the bracket flexes slightly, causing output signal changes. Calibrated load cells have been made with force capacities ranging from fractional ounces to tons.

To measure level, the load cell must be incorporated into the vessel's support structure. As process fluid fills the vessel, the force on the load cell increases. Knowing the vessel's geometry (specifically, it's cross-sectional area) and the fluid's specific gravity, it is a simple matter to convert the load cell's known output into the fluid level.



2.2 Proposed solution :

The solution suggested by me in order to fix the problem of monitoring the main tank water level and automatically switching on and off the motors , and maintain the water in the tank is using the IBM Iot platform ,Node-RED and Cloudant DB. The main steps of my solution are :

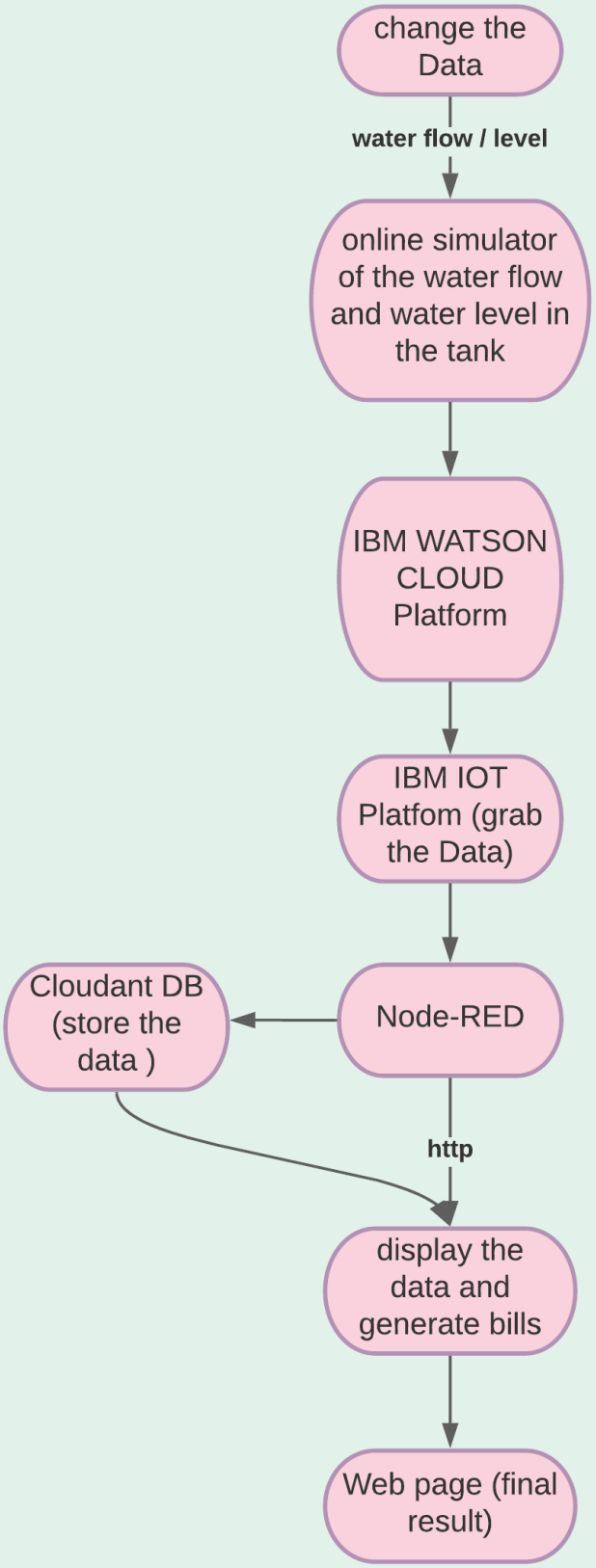
- Create IBM Academic Initiative Account
- Configure And Connect The Online Simulator Sensor

- Building A Web App

Technically , i'm going to follow the updated data of the water flow and level on the IBM iot platform and then create a Node-RED flow to get the Data from IBM Iot platform and store it into the cloudant BD , after that i'm going to display the tank water level and flow in the UI, at the end i'm going to retrieve the flowrate of individual houses and generate bills and dipslay them on the UI.

3.THEORITICAL ANALYSIS :

3.1.block diagram:


change the Data
water flow / level
online simulator of the water flow and water level in the tank
IBM WATSON CLOUD Platform
IBM IOT Platfom (grab the Data)
Cloudant DB (store the data)
Node-RED
http
display the data and generate bills
Web page (final result)

3.2 Hardware / Software designing:

Hardware requirements of the project:

- computer
- tank
- water flow sensor
- water level senor

Software requirements of the project:

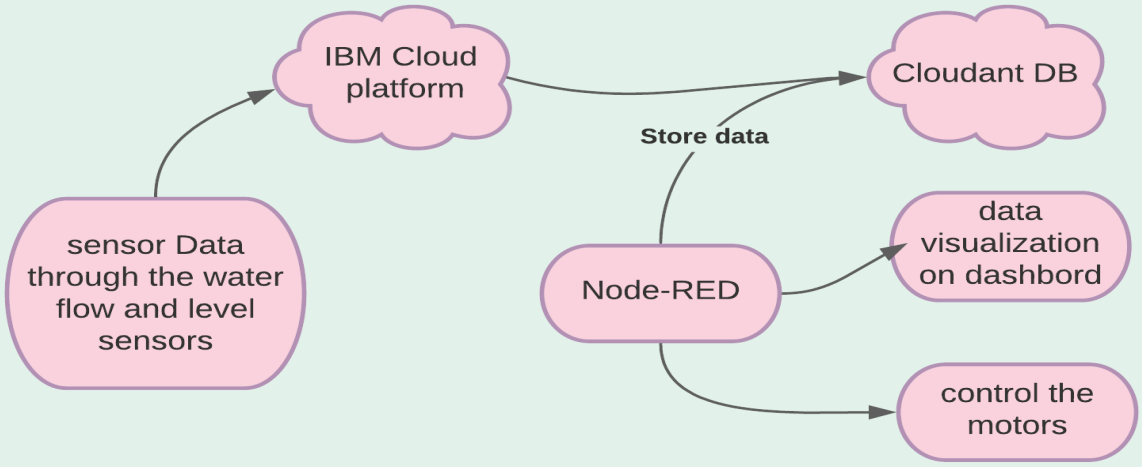
- ibm watson cloud
- ibm Iot platform
- Node-RED
- cloudant DB

4.EXPERIMENTAL INVESTIGATIONS:

While working on my project a lot of things became more clear in my head such as the connexion the the data coming from sensors, the use of the cloud platform and the node red flows and how each and every component is critical for the success and depolyment of the project.

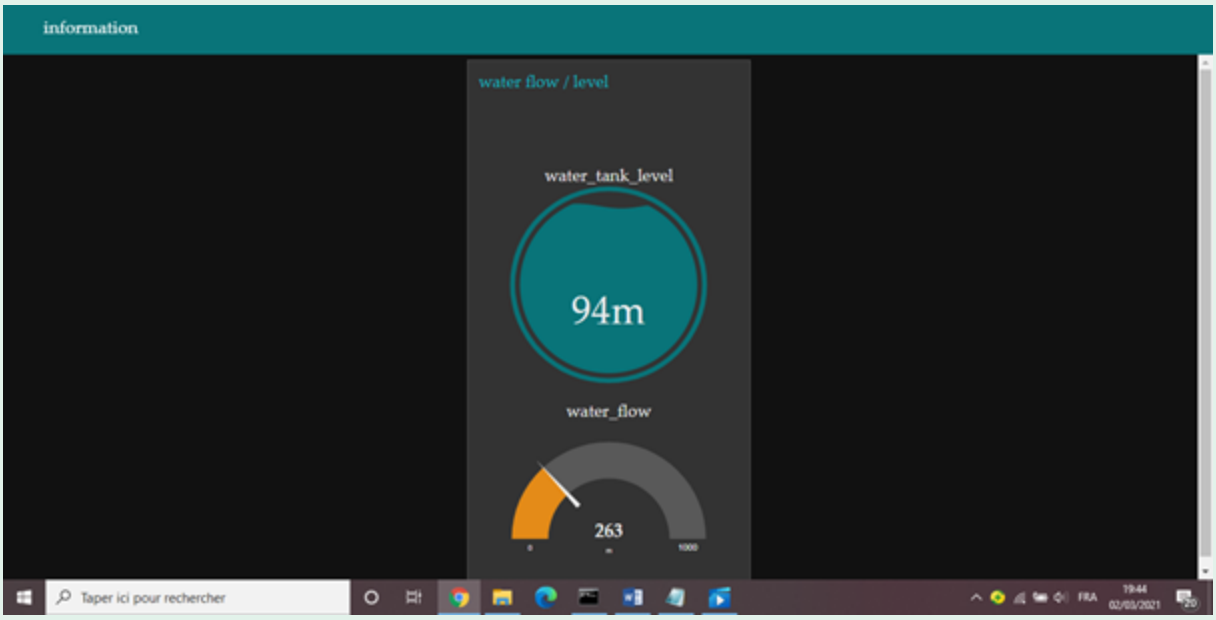
5.FLOWCHART:

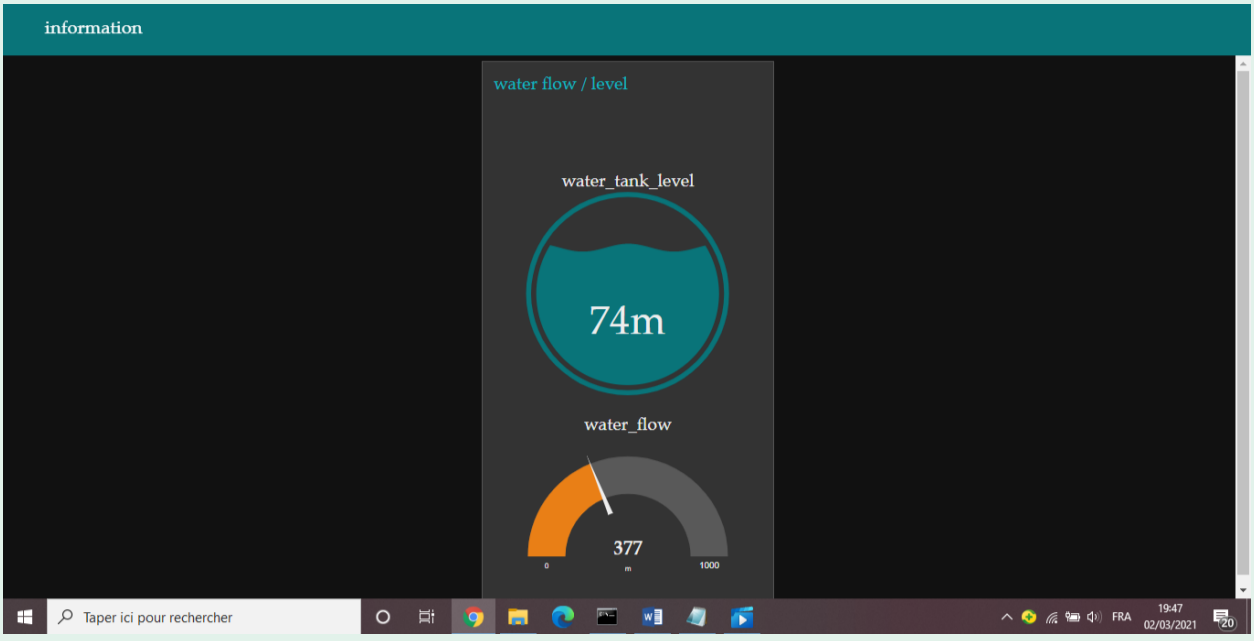
Diagram showing the control flow of the solution :



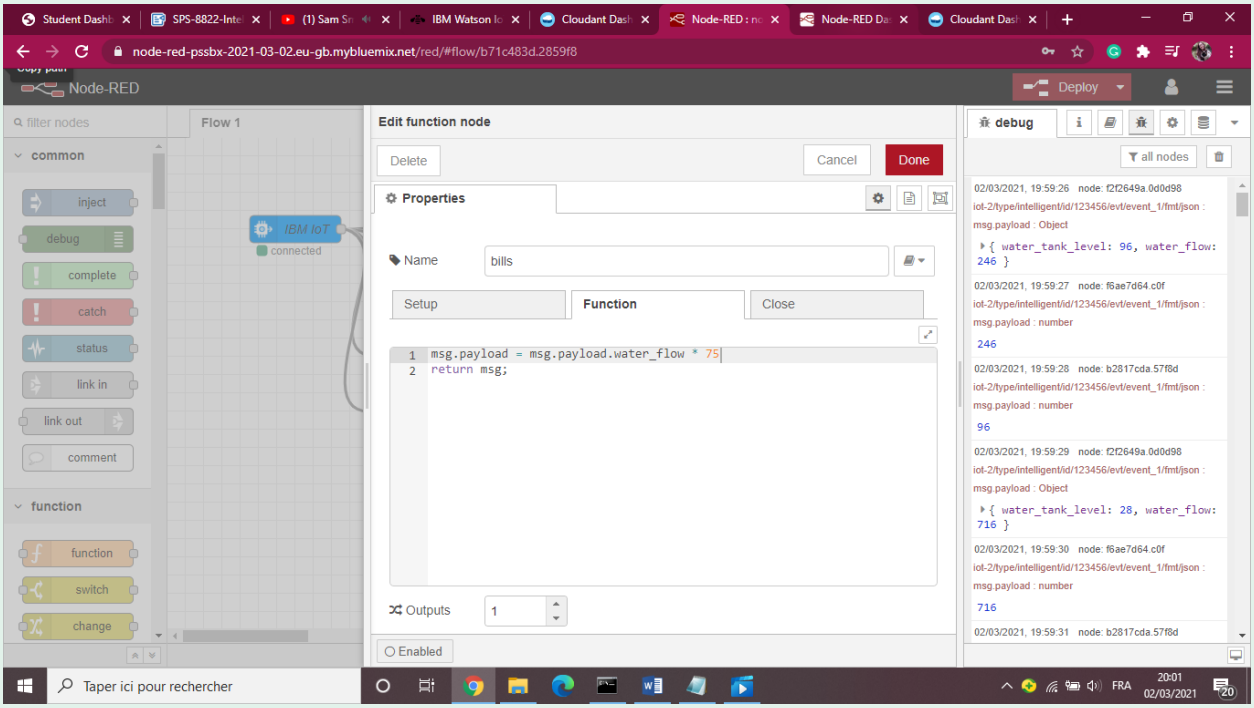
6.RESULT :

The dashbord visualization shows us :

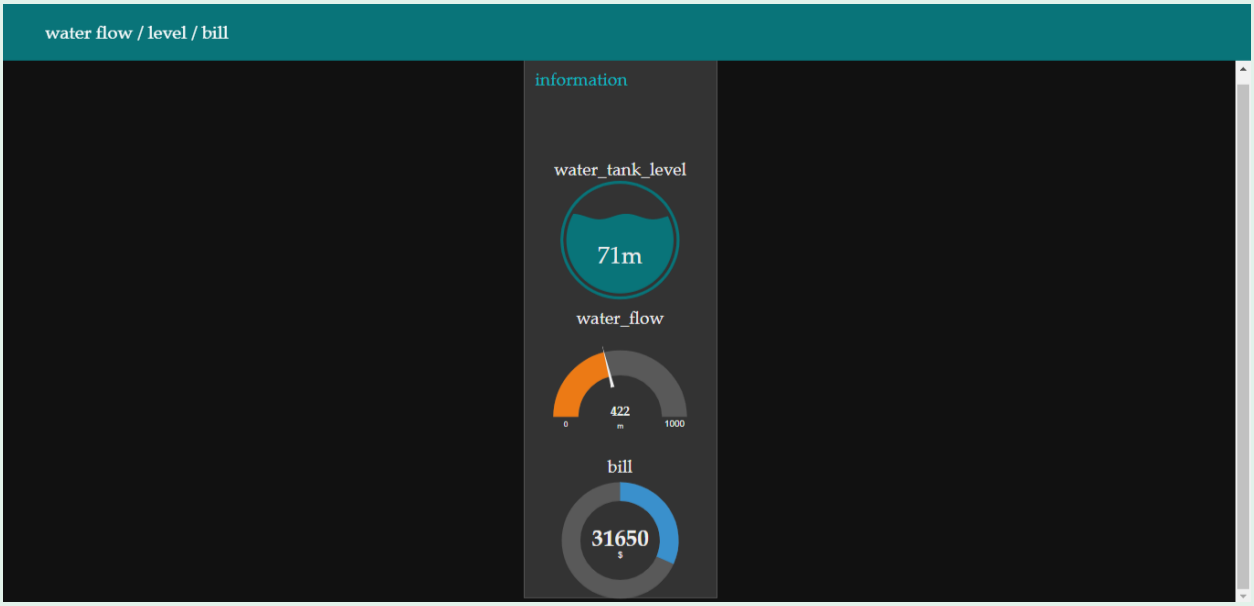


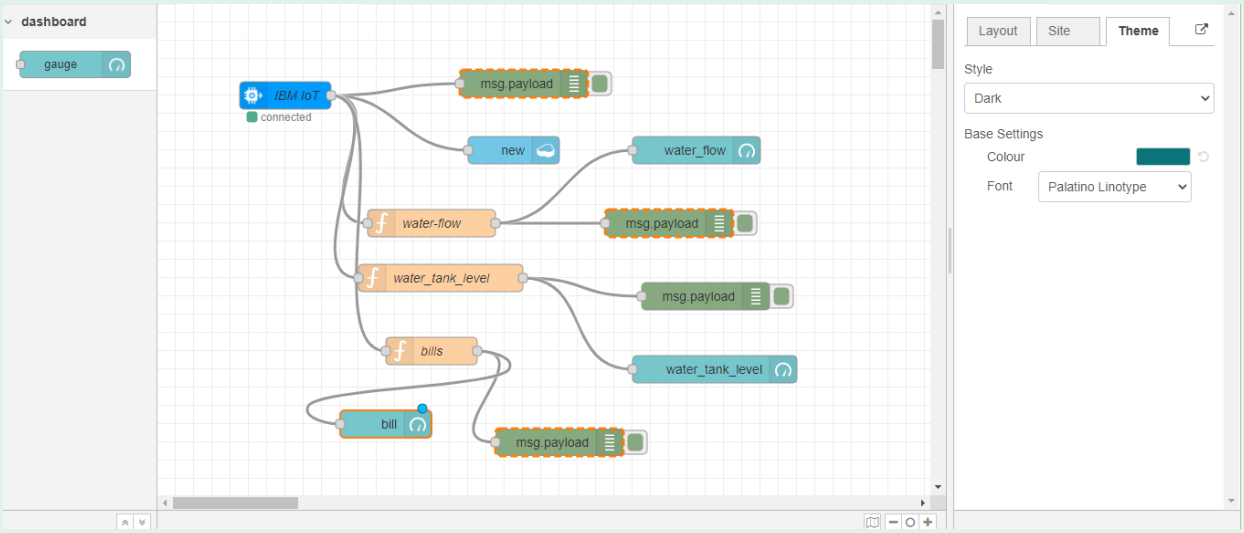


The bills calcuation gives us this result :



assuming that the price of 1gpm is 75$ (which is a random number)
which give us this result:





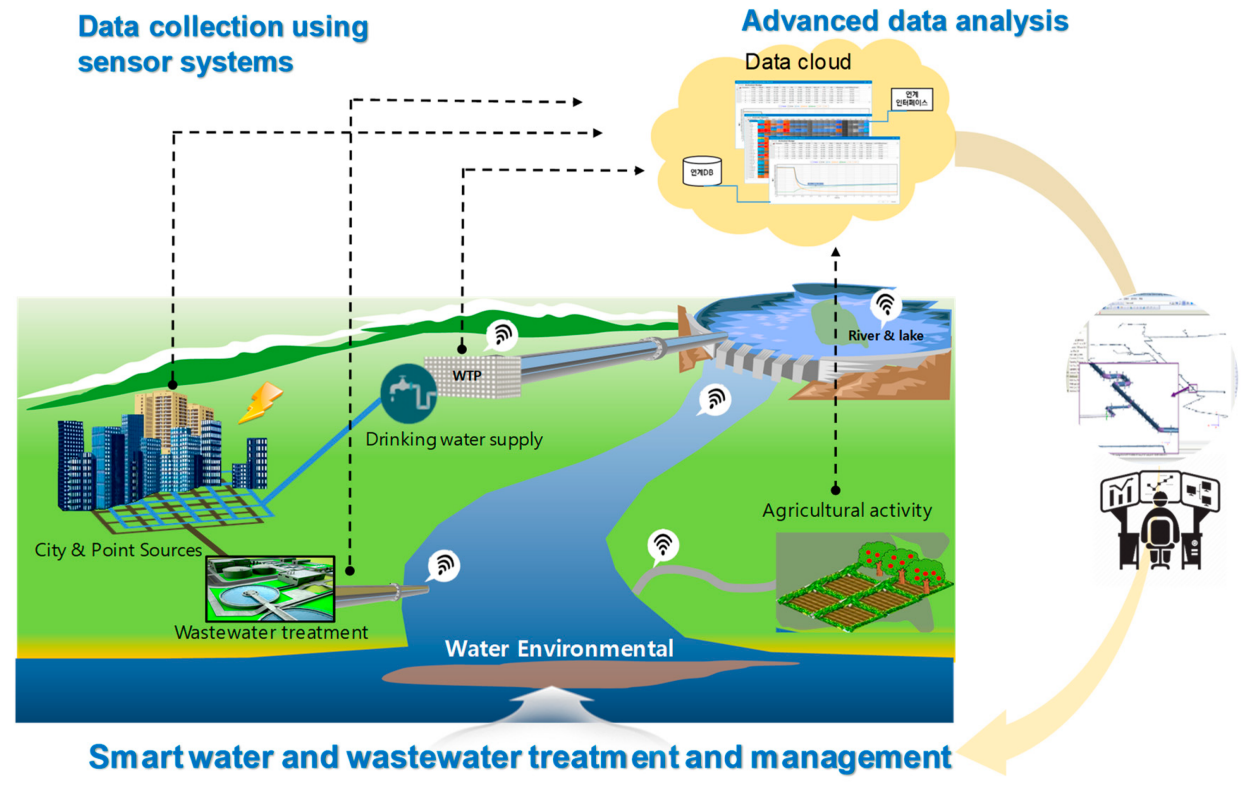
7.ADVANTAGES & DISADVANTAGES:

Advantages	Disadvantages
• Monitoring the water flowrate and level becomes easier and faster • It's more flexible for us to control the water tanks motors • It's a fast approach compared to the traditional ways of monitoring when it comes to generating the water bills and keeping an eye on the water tank level • The financial aspect is the best advantage. This project could replace humans who are in charge of monitoring.	• Privacy is a big issue with IoT. All the data must be encrypted so that data about the financial status of each house while generating the bills isn't common knowledge • There is a chance that the software can be hacked and the personal informations are misused. The possibilities are endless. Your prescription being changed or your account details being hacked could put anyone at risk • the more precise the result is the more complex the system can be

8.APPLICATIONS :

This soltion could be very useful in so many fiels such as:

- Agriculture : It is applied in agriculture to contuniously monitor the water in the tanks used to water the trees and plants .
- city and point sources
- river and lakes
- waste water treatment



9.CONCLUSION :

Monitoring helps with identifying the most valuable and efficient use of resources especially the most valuable resource on the planet : **water** , and monitoring it provides the necessary data to guide strategic planning, to design and implement programmes and projects, and to allocate, and re-allocate resources in better ways, that's why my project in not only the best way to keep an eye on these resources but also a garentee of a wise use of them. To summarize the steps i

did for my project , i first Configured and connected the online simulator to send the water flow rate and water level to IBM IoT device , and then using Node-RED i stored data received from IBM IoT device in cloudant DB and then i retrieved the monthly flowrate from cloudant db and calculated bills and finally i used Dashboard Nodes For Creating UI(Web App) And displayed Flow Rate And Water Level to get the result needed .

10.FUTURE SCOPE:

There's no doubt that this project hits some boundaries such as limited materials for some users , maybe for some others being connected to the internet 24/7 is a struggle especially when this project is applied in the argriculture which is most of the time in places far from the country , which could be an issue. that's why enprovements need to be made in the future to make sure not to face such problems. One of these emprovements is making the internet available to everyone where ever he is in order to avoid interruption in the monitoring system and disconnection between the sensors and the user interface .

11.BIBILOGRAPHY:

https://waterlevelcontrols.com/water-level-control-advantages-disadvantages/
https://new.abb.com/products/measurement-products/level/a-dozen-ways-to-measure-fluid-level

APPENDIX:

source code of the project :

node-RED URL :

https://node-red-pssbx-2021-03-02.eu-gb.mybluemix.net/red/#flow/b71c483d.2859f8