IBM CALL FOR CODE 2020-

IIoT Solution for alarm the Saltwater intrusion contain and automation irrigation at Mekong Delta river

MAPLE SMART CONTROL

Bill Chuong – July 22, 2020

Video Clip - 45sec – Part 1

1. ▶ What is the problem?

2. How have our solved its?

PROBLEMS

1. The real-world problem we identified

▶ 1. Saltwater intrusion rises from downstream from 10 km to 200 km

▶ 2. Farmers does not know and they use river water to feed the rice field and fruit field, then the big damage to field and fruit

▶ 3.A lot of Hydropower plant in upstream and water reservoir to keep the water in upstream with impact water in downtown at Mekong Delta
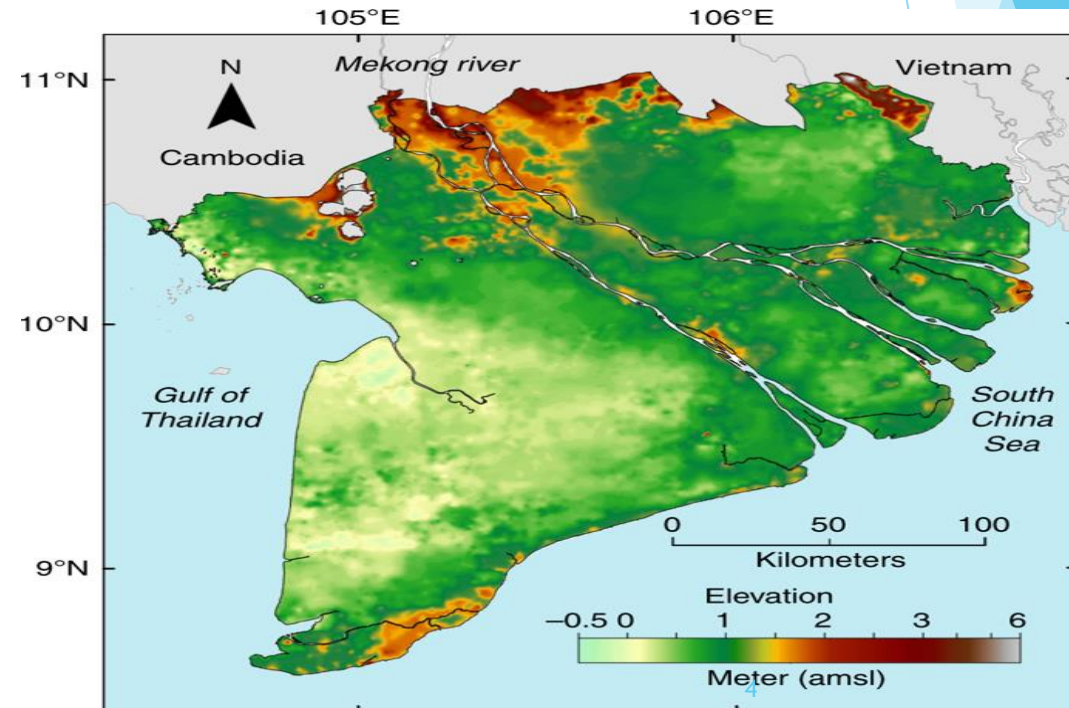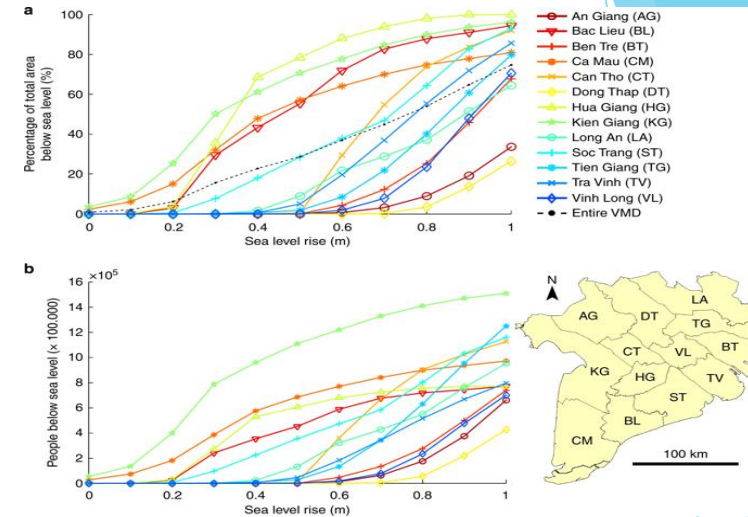
PROBLEM 1 : SALTWATER INTRUSION DURING DEC – JUNE AT VIET NAM EVERY YEAR

- Saltwater intrusion with a salinity rate of four grammes per litter is expected to enter 50-95 kilometers deep into the delta's main rivers

- Can Tho City is nearly 100 kilometer from the sea. read **3,500 parts per thousand (ppt), normal water of less than 250 ppt**.

- On 2016, **600,000 people lost access to freshwater, while 160,000 hectares of paddy were destroyed and 800,000 tons of rice were lost.**

- **Financial damage from that drought hit US$237 million**
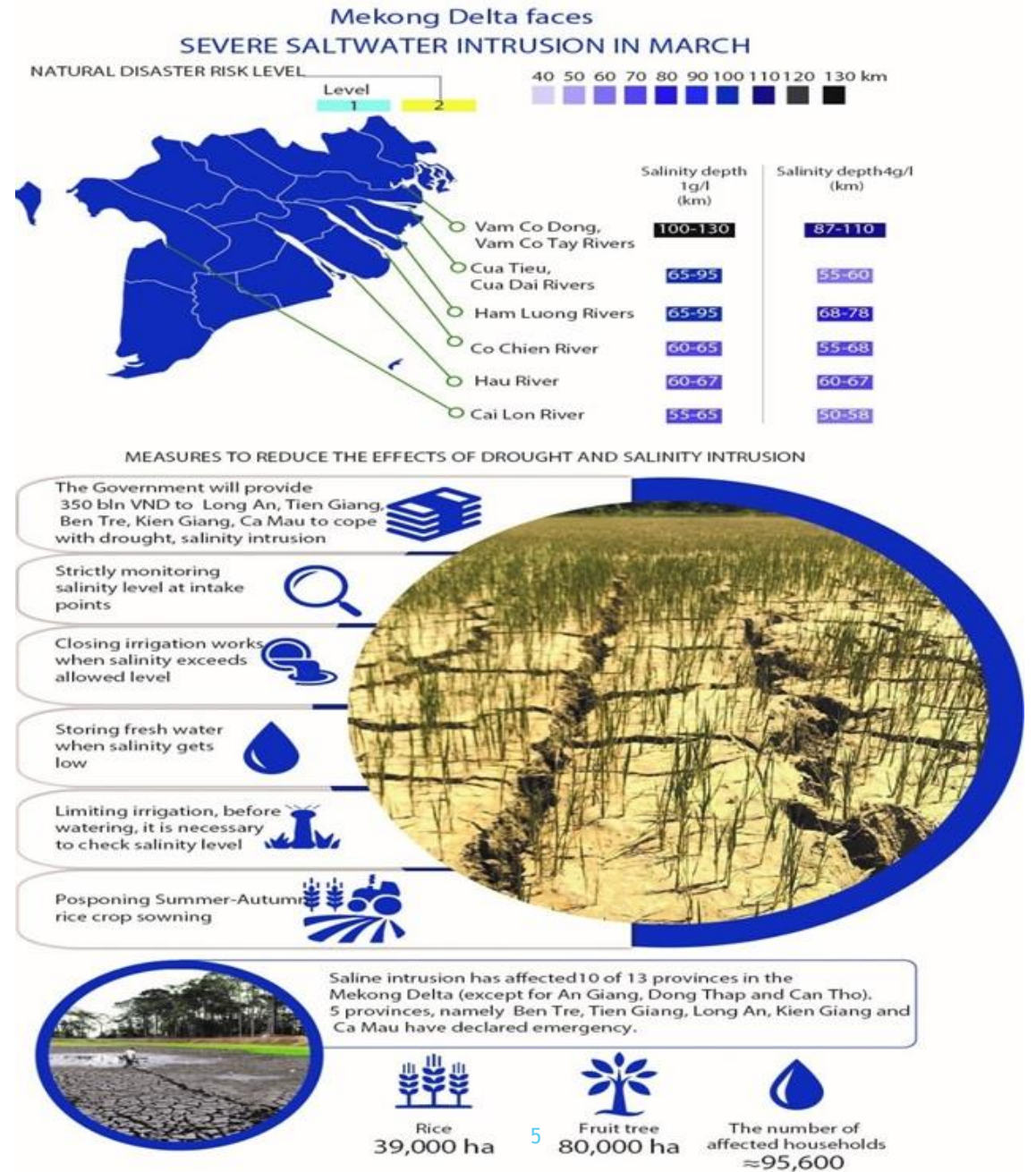
PROBLEM 2 :

LACK OF WATER IN HOT SEASON

▶ Mekong Delta region have got with the absence of flood waters.

▶ When annual flooding does not happen or when it's late, cropping and fishing activities in the Mekong Delta are shutdown.

▶ Upstream countries have sought to store water in their dams

A family in Kien Giang Province in the Mekong Delta stands on their fishing farm that lacks water in July 2019.

Site	Max. water level recorded in 2000	Max. water level recorded in 2011	Max. water level recorded in 2018
Chao Doc	4.89	4.24	3.61
Tan Chau	5.04	4.74	4.01

Table 1: Maximum water levels in meters recorded at Chao Doc and Tan Chau stations in 2018 in comparison with the major flood events in 2000 and 2011 (Source: Mekong River Commission 2014, Mekong River Commission river gauge data)

Video Clip - 90 sec – Part 2

1. Our Description

2. Demo

▶

3. Using IBM Cloud

4. Node-RED interface

5. Prototype

OUR DESCRIPTION

The idea

This IIoT solution aims to help farmers, particularly those in adapting climate change, **monitor saltwater intrusion data** and adapt their crop strategies to optimize water usage. Beside that we will use automation irrigation when they saltwater intrusion is over permission than the pump will switch on from river pump to Saltwater treatment pump to save the water and protect the crop

Climate change with sea water rising and keeping the water for Hydropower Plant and Reservoir of upstream countries are causing farmers to reconsider the crops by alarm of saltwater intrusion water level and automation irrigation, but they are aware of what crops will have a big damage in the new circumstances, according to the changing water availability.

Awareness and education of suitable IoT solution with IBM Service in order to make the farmer to reduce the loss with a good yield, will help farmers make water-friendly choices and control the loss of their crop.

To achieve these goals we propose the creation of a framework full IIoT solution from IBM Cloud Service and Maple Smart Control full solution to create solutions focused on MONITOR AND CONTROL saltwater intrusion and automation irrigation for farmers affected by climate change around the world.

The framework will also target the Agricultural and Aquaculture sectors, also known as IIoT technology for real time and automation control as well as applying the experiences from senior farmers data for Machine Training or predict saltwater instruction when we have enough data for Machine Learning .

We intend to do the pilot project at 3 points at Mekong Delta with this solution in order to reduce the damage for farmer on 2021. We need the support from IBM and UN for this project will come true.

OUR SOLUTION

**https://node-iot-msc.mybluemix.net/ui/#!/0?socketid=PfqILuXp8fdTqEbtAAAE**
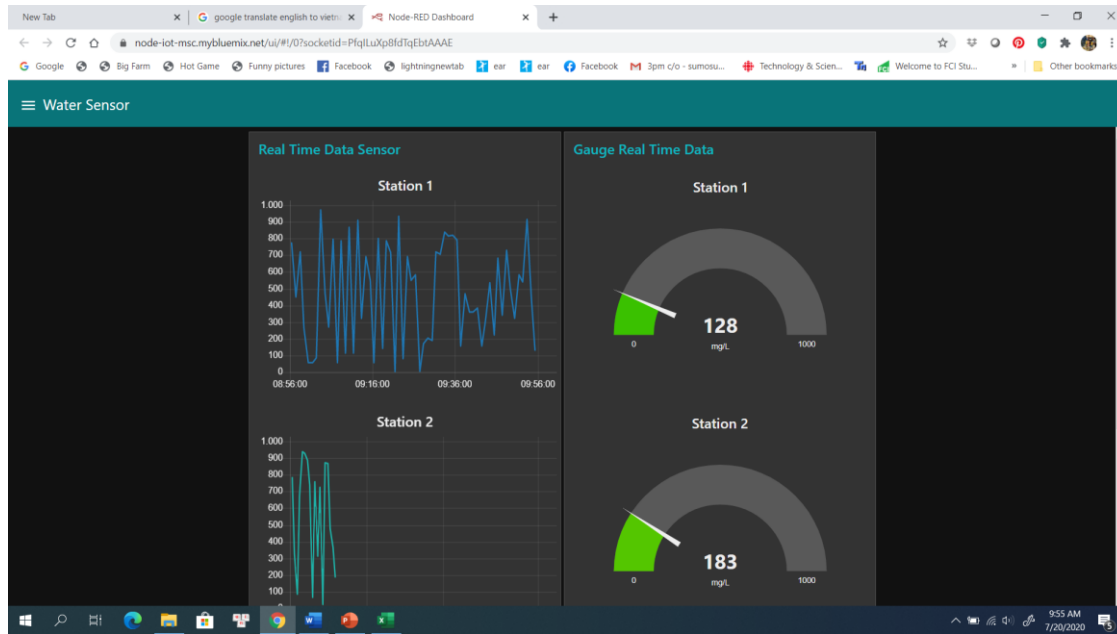
2. Describe the technology project we created

- 1/ Measure the Seawater intrusion contain in Water and put this value in Monitoring. Then sending the alarm to Farm

- 2/ Setting the automation function from River Pump to switch to River Water Treatment station or Well pump station

- 3/ Compare the water contain with experience data from Senior Farmer OR predict data by machine learning for Seawater intrusion contain after getting the data in 1 – 2 years.
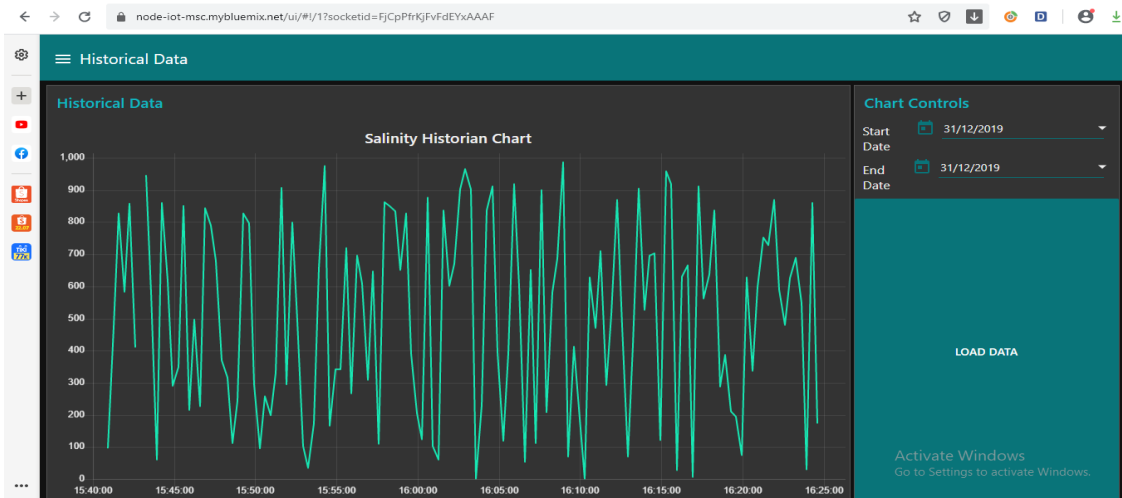
Node-RED – IBM SERVICES INTERFACE WITH END-USER

▶1) Deployed Node-RED Application to IBM Cloud

▶2) Connected water sensors to Watson IoT Platform

▶3) Stored water quality data in IBM Cloudant database

▶4) Display Water Basin maps using Node-RED Dashboard

▶5) Plot water quality data in Node-RED charts

▶6) Alert farmers on high water salinity levels

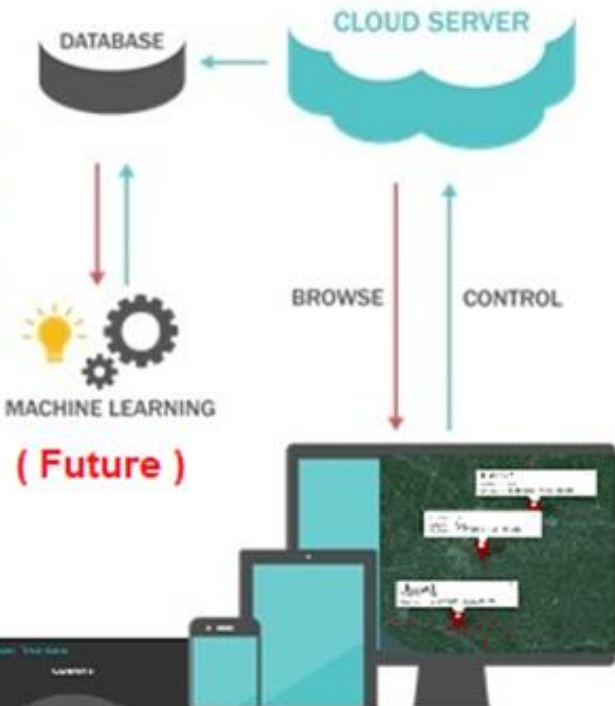▶7) Automatic Switch transfer from River pump to Water Treatment pump when the Saltwater intrusion meet the over permission

11
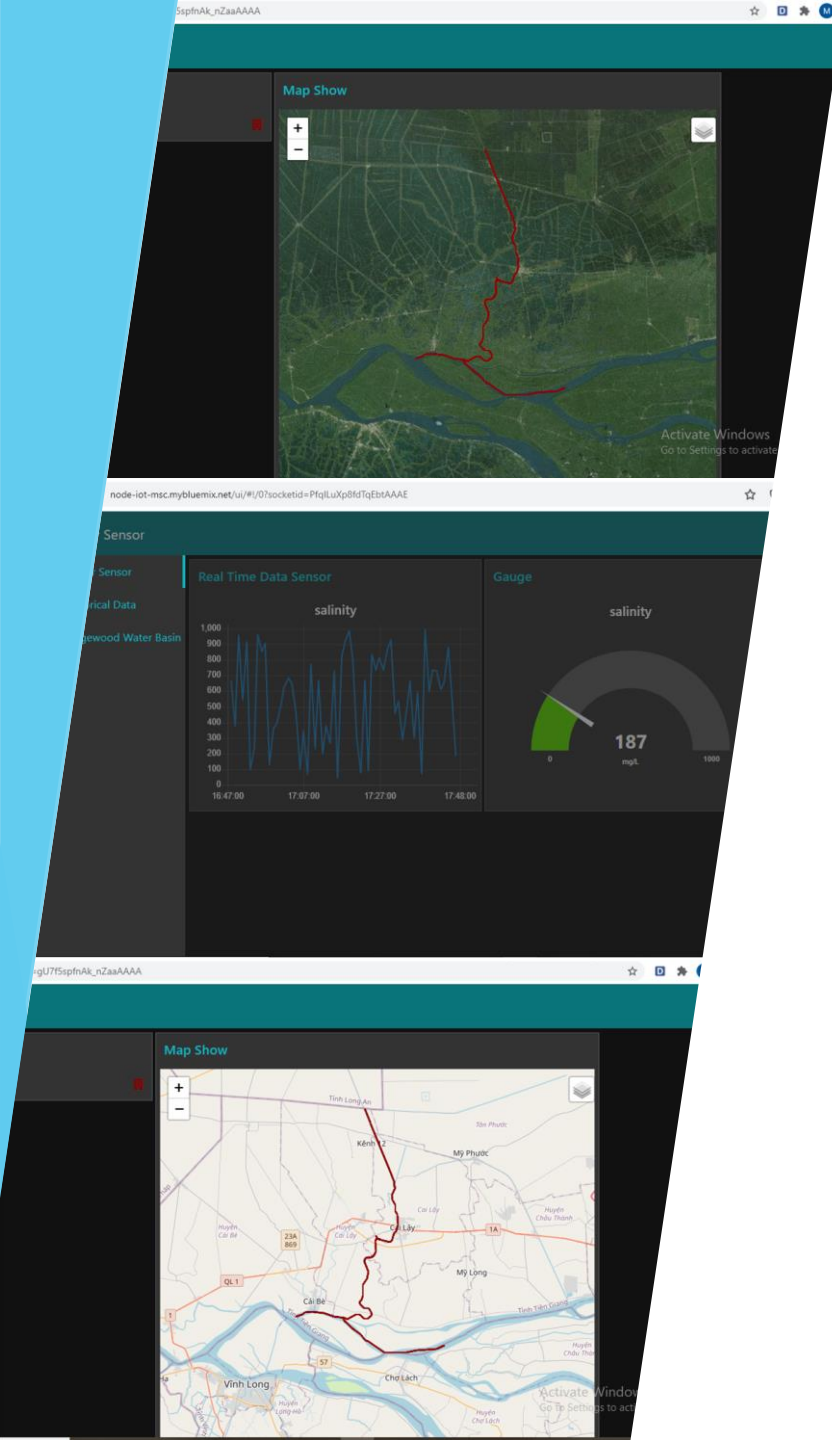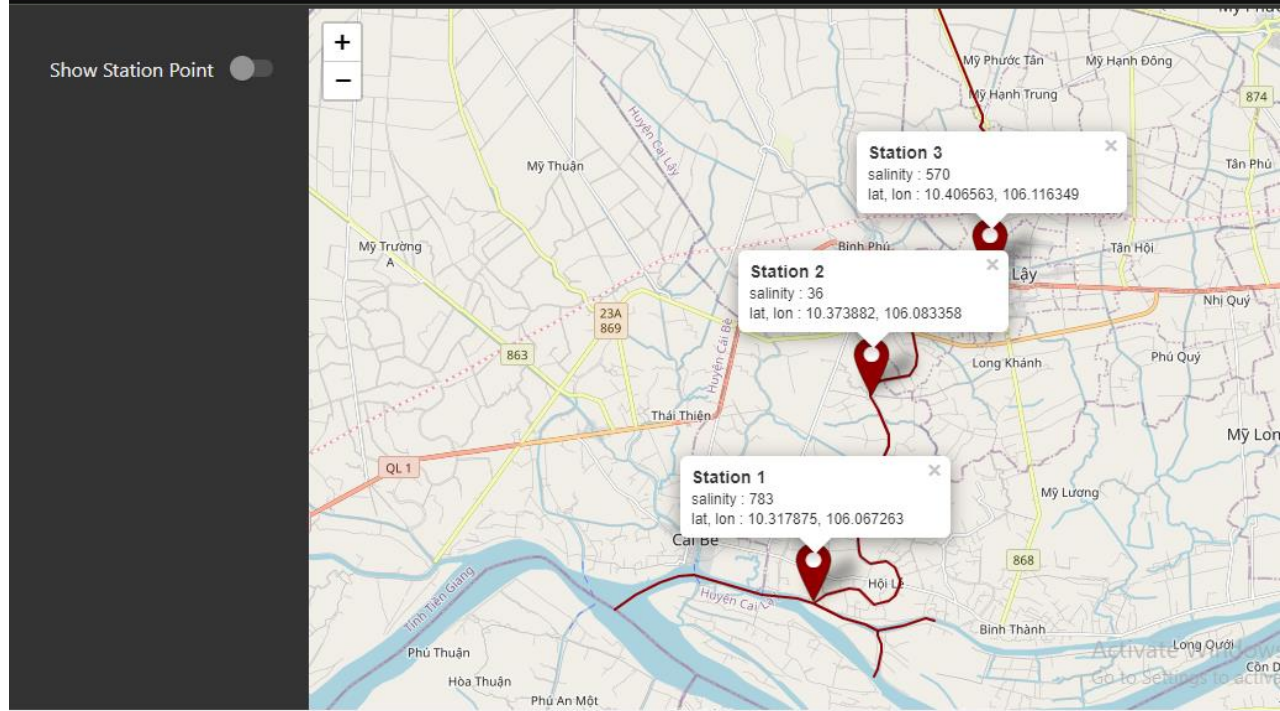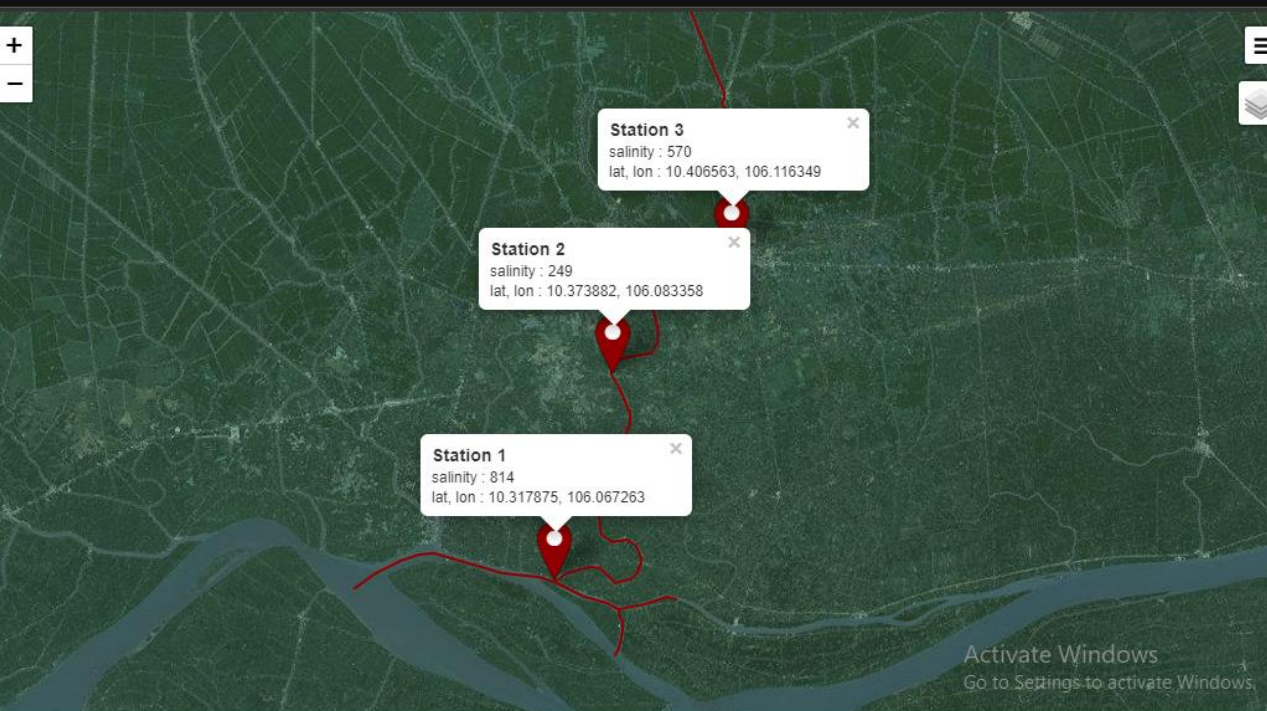
MAP LOCATION WITH INDICATION THE VALUE
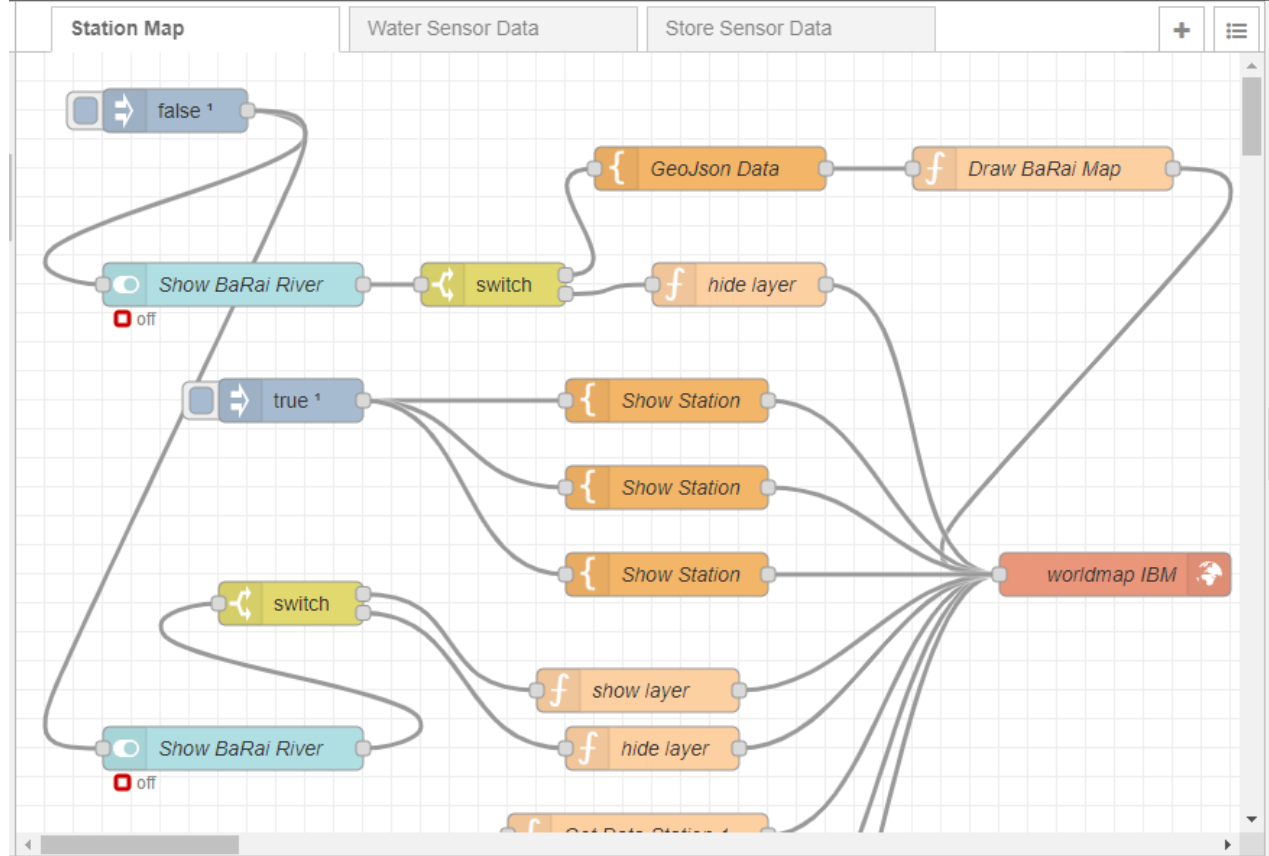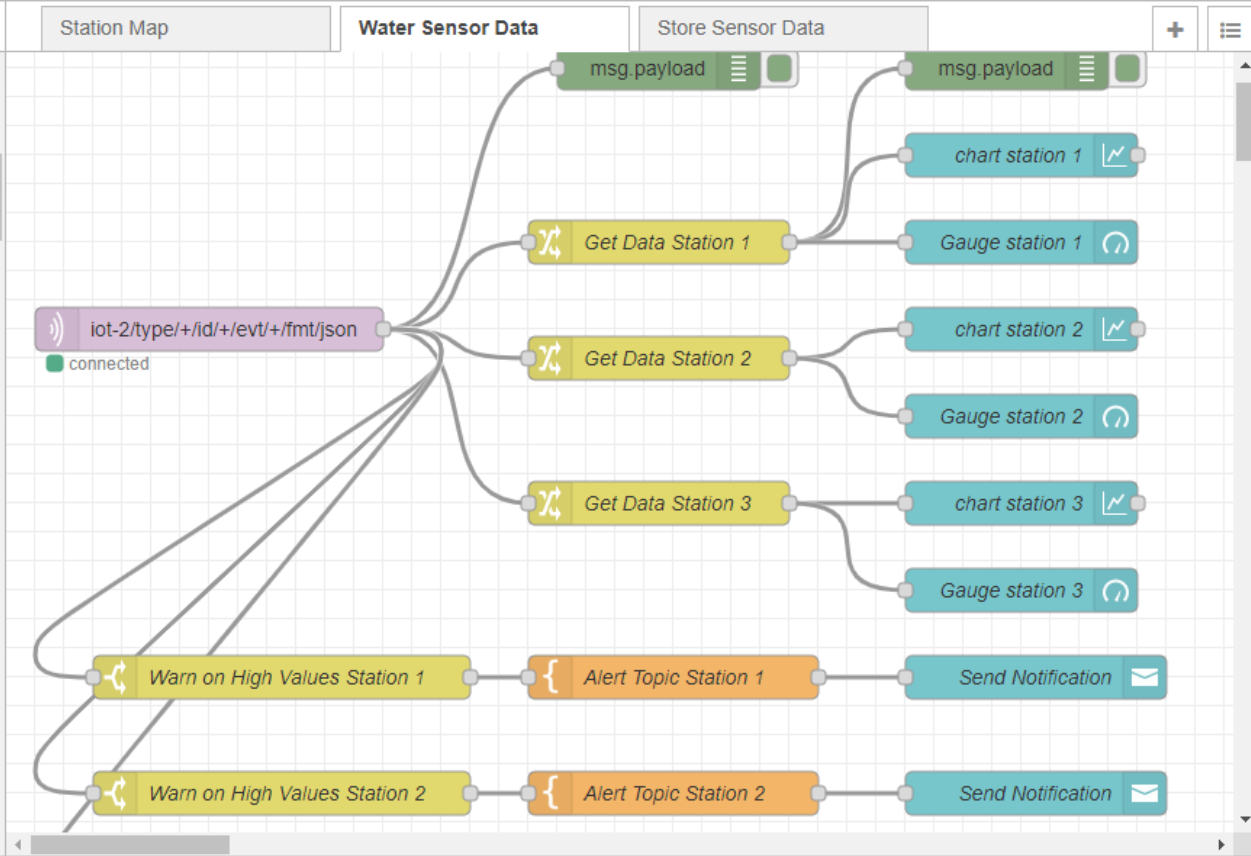
Node-RED FLOW CHART DEPLOY IBM CLOUD

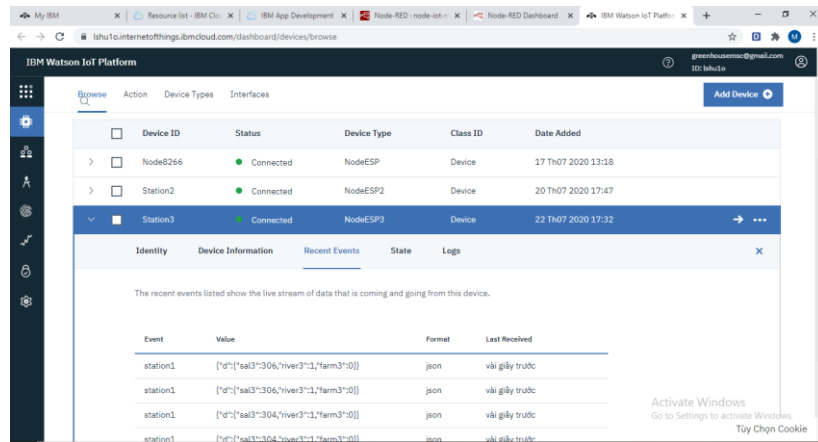# ARCHITECTURE FOR
 IBM CLOUD AND Node-RED APP

MSC ARCHITECTURE

OUR CONNECTION WITH IBM CLOUD
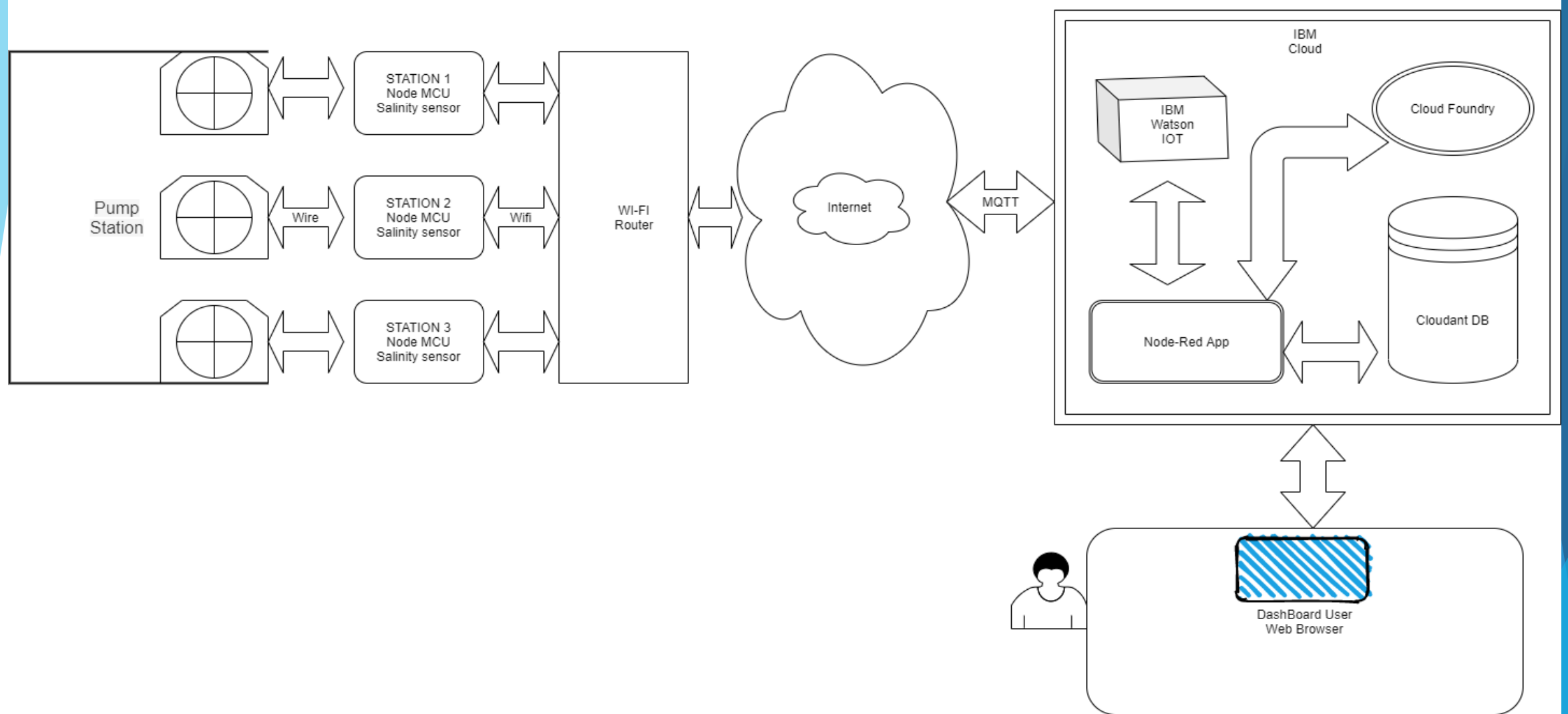
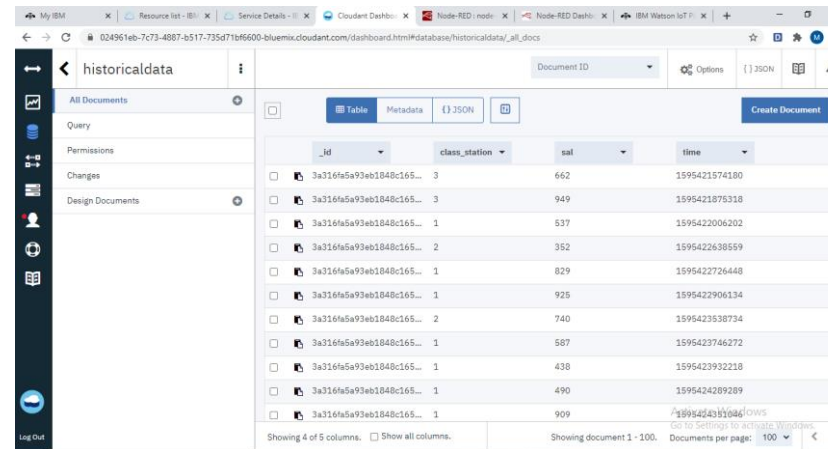# MSC CONTROLLER CONNECT WITH IBM SERVICES

IBM SERVICE

IBM WATSON

IBM CLOUDANT

INTERFACE WITH END-USERS

Node.1 station

NODE.n Station

PUBLIC VIEWS

LOCATION –DATA VALUE

DATA VISUALIZATION

MSC CONTROLLER

MSC CONTROLLER

SENSOR

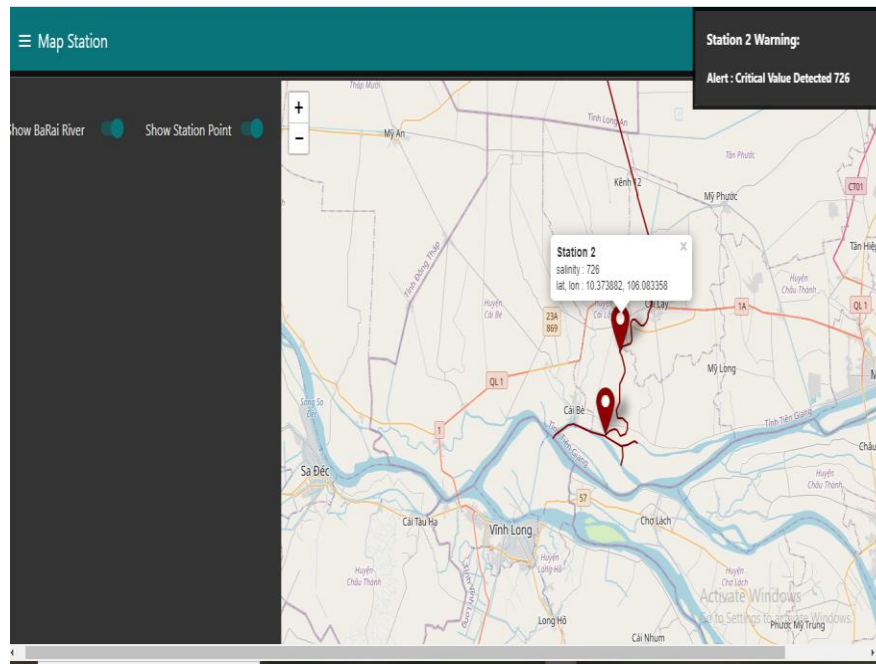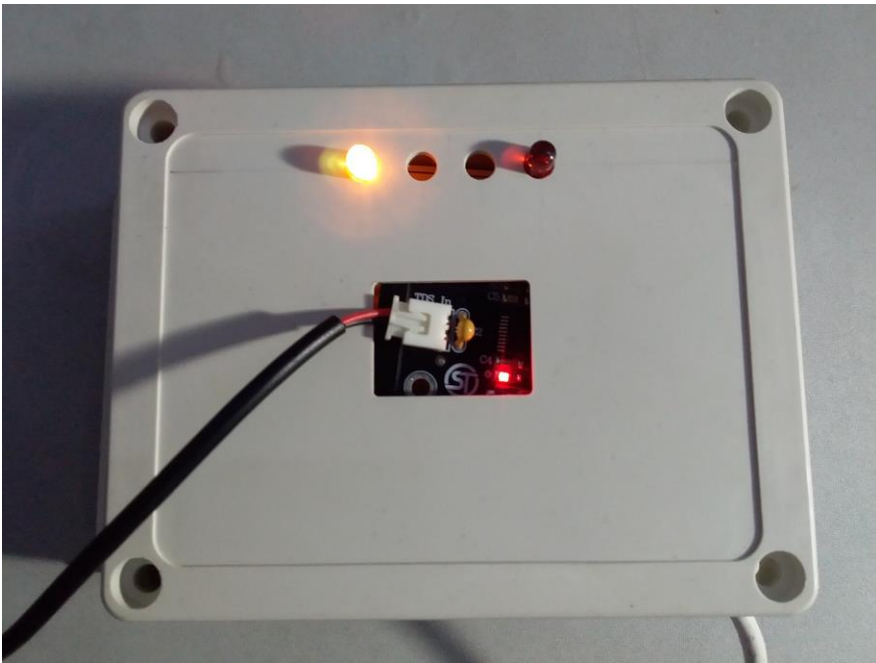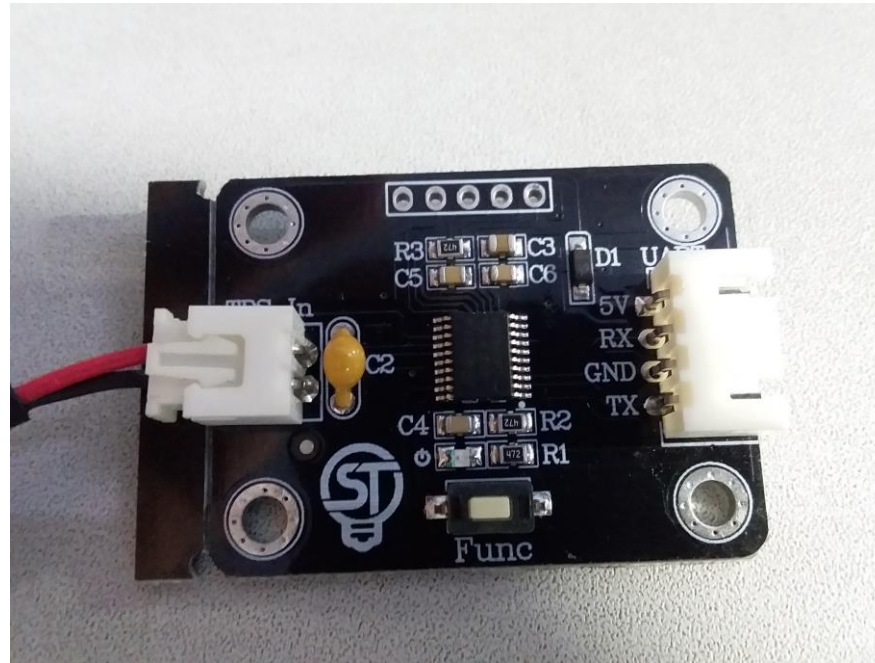# OUR PROTOTYPE AT WORKSHOP

1) Saltwater instruction contain greater than 500 ppm

2) River pump OFF/ Water Treatment pump ON

1) Saltwater instruction contain less than 500 ppm

2. River pump ON/ Water Treatment pump OFF

COMPARISION WITH EXISTING SOLUTION

3. Explains why it's better than any existing solution

- 3.1/ At the moment, they have no solution as Mekong Delta at Viet Nam without this system

- 3.2/ We can reduce the damage for **600,000 people who lost access to freshwater, while 160,000 hectares of paddy were destroyed and 800,000 tons of rice were lost. Financial damage from that drought hit US$237 million**

OUR BETTER BECAUSE

- 3.3/ **Water sustainability: Maple Smart Control (MSC) will use the Automation Irrigation for when the saltwater intrusion contain is over permission than the pump will automation will switch from river pump to water treatment pump .** This IoT-based solution aims to help farmers, particularly those in, monitor saltwater intrusion data and adapt their crop strategies to optimize water usage and save the water treatment material

- 3.4/ **Disaster resiliency: MSC will use the monitor system for saltwater intrusion contain in branch river in hot season at Viet Nam during Dec – June in every years in order** to help communities prepare for saltwater intrusion, this app will provide residents with real-time information on the capacity of saltwater intrusion contain

Video Clip - 45 sec – Part 3

▶

1. Result

2. Next Step
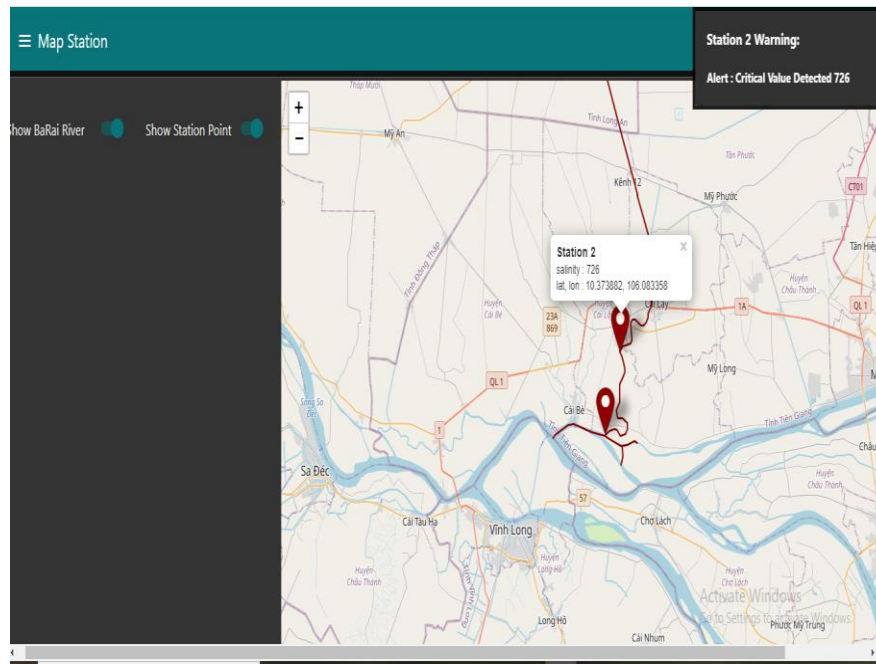
OUR PROTOTYPE RESULT

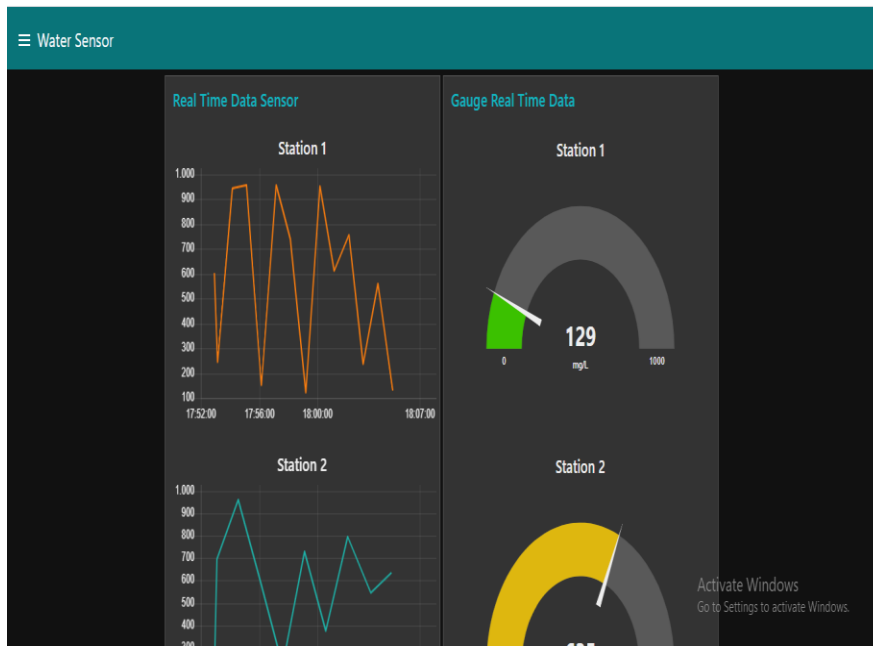# PUBLIC VIEWS

LOCATION –DATA VALUE

DATA VISUALIZATION

INTERFACE WITH END-USERS

Node.1 station

NODE.n Station

OUR PROTOTYPE AT WORKSHOP

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BUSINESS MODEL

The business model

The Business Model Canvas

Designed for:	Designed by:	Date:	Version:

Key Partners 🔗

1) IBM for Cloud

2) Local Goverment

3) Big Farmer Enterprise

Key Activities ✓

1) Free trial 1 year for pilot and trial

2) B2B and B2C business

3) Help farmer & low income

Key Resources 🏭

1) Build the team

2) Training & Education

3) Subcription by yearly

Value Propositions 🎁

1) Saving Water and Energy

2) Reduce big damage for Farmers

3) Disaster resiliency for rising sea water.

Customer Relationships ❤

1) Encourage farmers to use and try for benefit for them

2) Build the relationship

3) Advisor and education

Channels 🚚

1) Build the agent and channel for supply the equipment and technical advice

2) They can contact IBM or UN or us for using this service

Customer Segments

1) Big customer is big enterprise for farmer or food company

2) Areas and Zone farmers for rice and juice fruit

3) Government to monitor and supervisor

4) Supervisor the climage change from NGO

Cost Structure 🏷

1) Cost for equipment

2) Cost for Cloud and Mob App

3) Cost for Installation

Revenue Streams 💰

1) Subcription by montly and yearly

2) NGO support

Future funding needs & Sustainability plan.

FUNDING NEEDS

- 1) Buying the equipment

- 2) Buying the Cloud and Mob App

- 3) Pay the manpower for maintenance the service

SUSTAINABILITY PLAN

- 1) Subscriptions by monthly – yearly

- 2) Gov will buy this service

- 3) Support from NGO

- 4) Support from IBM – UN for Climate change fund

What we do in the next step when we can get the prize

1. We intend to do the pilot project at 3 points at Mekong Delta with this solution in order to reduce the damage for farmer on 2021.

We need the support from IBM and UN for this project will come true.

We do the pilot project to prove our concept and work with IBM for the long term services.

ROAD MAP FOR DOING THE PILOT PROJECT

No	Job of Work	Duration	Time	Remark
1	Concept design	1 month	July 1, 2020	
2	Market Research	1 month	Aug 2020	3 points at VN
3	Cloud Architect design	1 month	Sept 2020	
	Detail design of hardware	1 month	Sept 2020	
4	IIoT Prototype at workshop	1 month	Oct 2020	
5	Integrated IBM Watson, IBM Cloud and IBM Database	1 month	Oct 2020	
6	Node-Red API interface and design	1 month	Nov 2020	
7	Trial at site	1 month	Feb – March 2021	6 months in Hot season at VN
8	Evaluation and Report	1 month	Apr 2021	

OUR TEAM FOR THE SIMILAR PROJECT

Mr. Bill Chuong (Team Leader)

-5 years in sale and project sale
-5 years in Management Level

Mr. Senko Hao
5 years in Hardware Engineer

Mr. Robert Tay
3 Years in Mobil and software

Mr. Tony Thoi
2 years in Database and Cloud

Electrical Consultant

5 years experience in electrical solution at Canada

Electrical/ Plumping Contractor

5 years experience Canada

Marketing Consultant

Legal – Accountant – Tax – Administration

CONTACT US

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