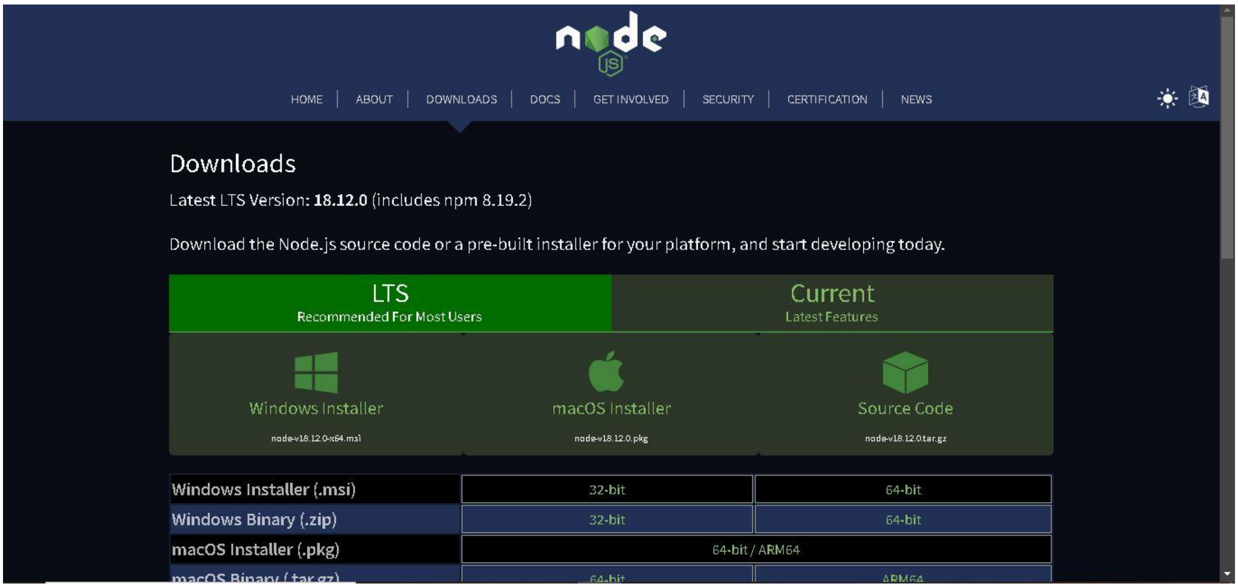
Date	05 November 2022
Team ID	PNT2022TMID47455
Project Name	Real Time River Water Quality Monitoring And Control System

STEP 1: Download and Install node.js.



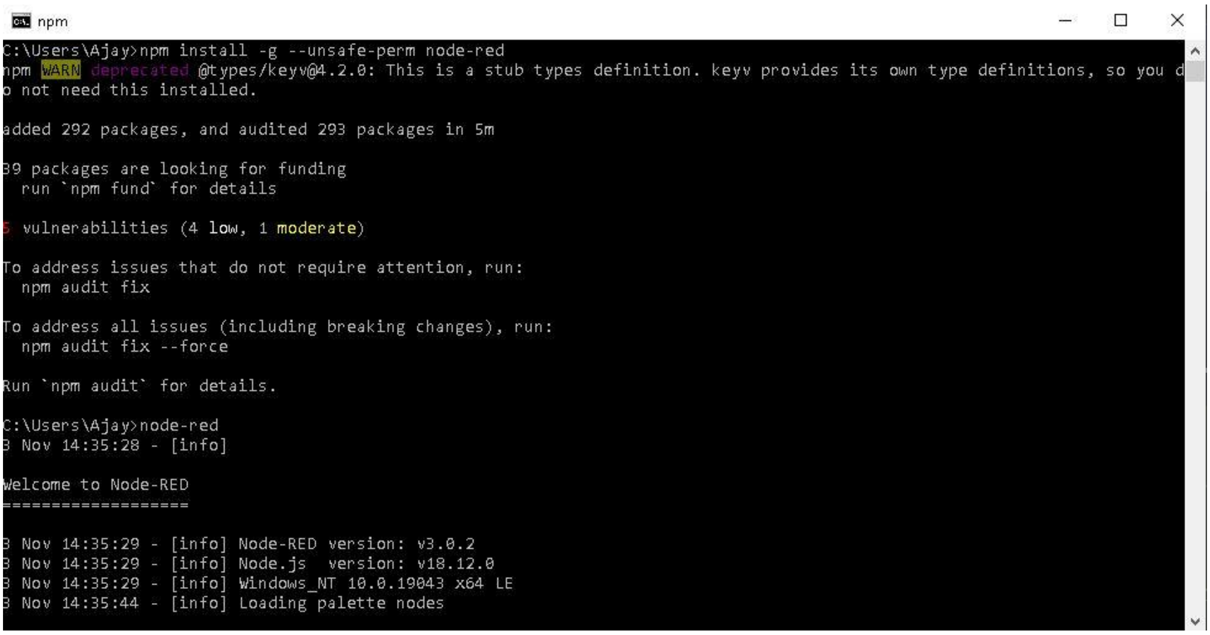
Downloads

Latest LTS Version: **18.12.0** (includes npm 8.19.2)

Download the Node.js source code or a pre-built installer for your platform, and start developing today.

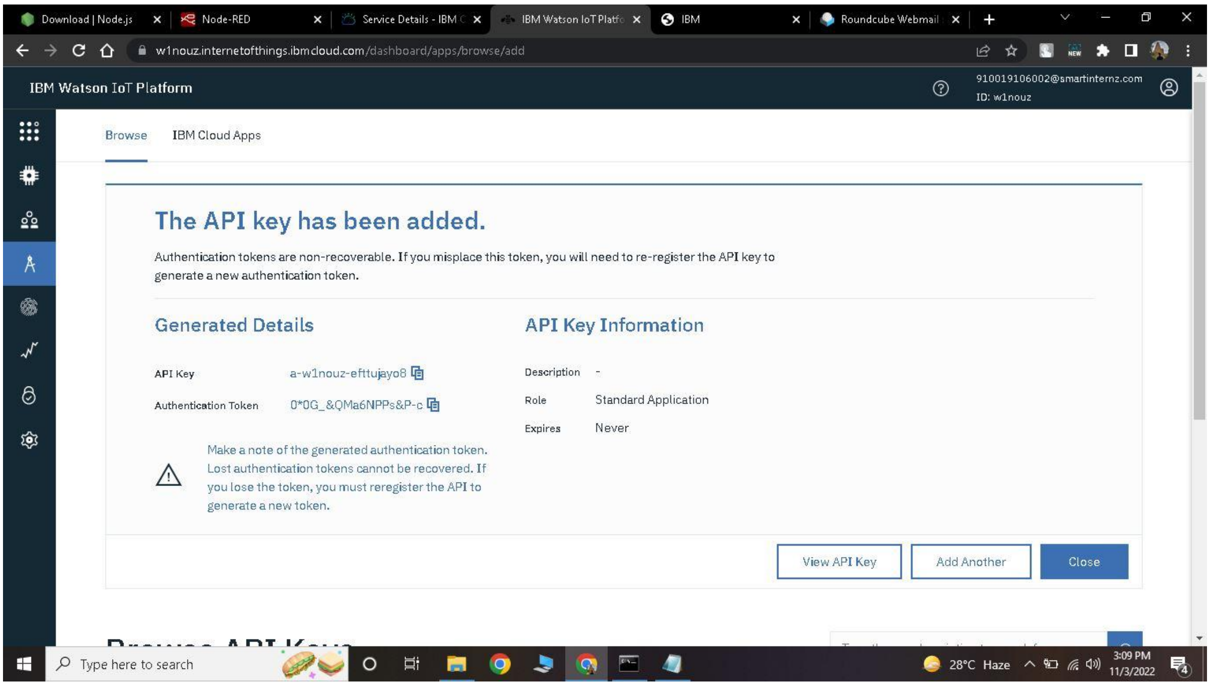
Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit / ARM64	
macOS Binary (.tar.gz)	64-bit	ARM64

STEP 2: Setup node.js and configure command prompt for error check. Open node-red from the generated link.



```
C:\Users\Ajay>npm install -g --unsafe-perm node-red
npm WARN deprecated @types/keyv@4.2.0: This is a stub types definition. keyv provides its own type definitions, so you d
o not need this installed.

added 292 packages, and audited 293 packages in 5m

39 packages are looking for funding
  run `npm fund` for details

5 vulnerabilities (4 low, 1 moderate)

To address issues that do not require attention, run:
  npm audit fix

To address all issues (including breaking changes), run:
  npm audit fix --force

Run `npm audit` for details.

C:\Users\Ajay>node-red
3 Nov 14:35:28 - [info]

Welcome to Node-RED
===================

3 Nov 14:35:29 - [info] Node-RED version: v3.0.2
3 Nov 14:35:29 - [info] Node.js  version: v18.12.0
3 Nov 14:35:29 - [info] Windows_NT 10.0.19043 x64 LE
3 Nov 14:35:44 - [info] Loading palette nodes
```

STEP 3: Generating API key and Authentication token.



w1nouz.internetofthings.ibmcloud.com/dashboard/apps/browse/add

IBM Watson IoT Platform

910019106002@smartinternz.com
ID: w1nouz

Browse IBM Cloud Apps

The API key has been added.

Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the API key to generate a new authentication token.

Generated Details

API Key a-w1nouz-efttujayo8

Authentication Token 0*0G_&QMa6NPPs&P-c

⚠ Make a note of the generated authentication token. Lost authentication tokens cannot be recovered. If you lose the token, you must reregister the API to generate a new token.

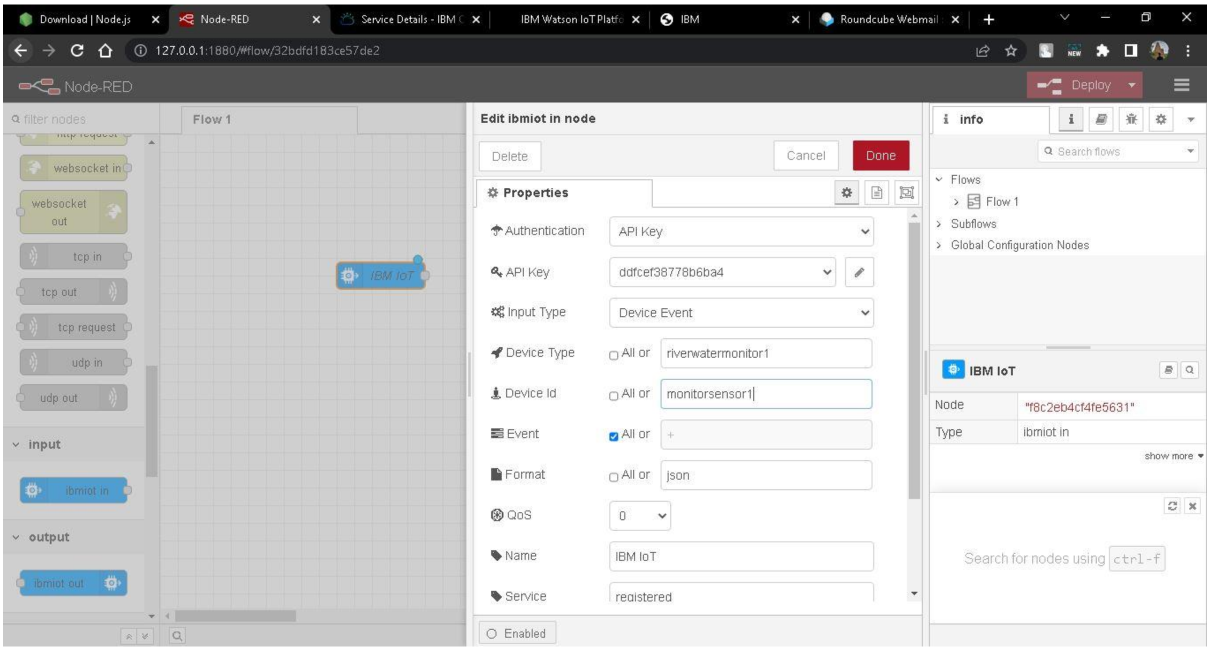
API Key Information

Description -

Role Standard Application

Expires Never

STEP 4: Edit Ibmiot in node.



127.0.0.1:1880/#flow/32bdfd183ce57de2

Edit ibmiot in node

Authentication: API Key

API Key: ddfcef38778b6ba4

Input Type: Device Event

Device Type: □ All or riverwatermonitor1

Device Id: □ All or monitorsensor1

Event: ☑ All or +

Format: □ All or json

QoS: 0

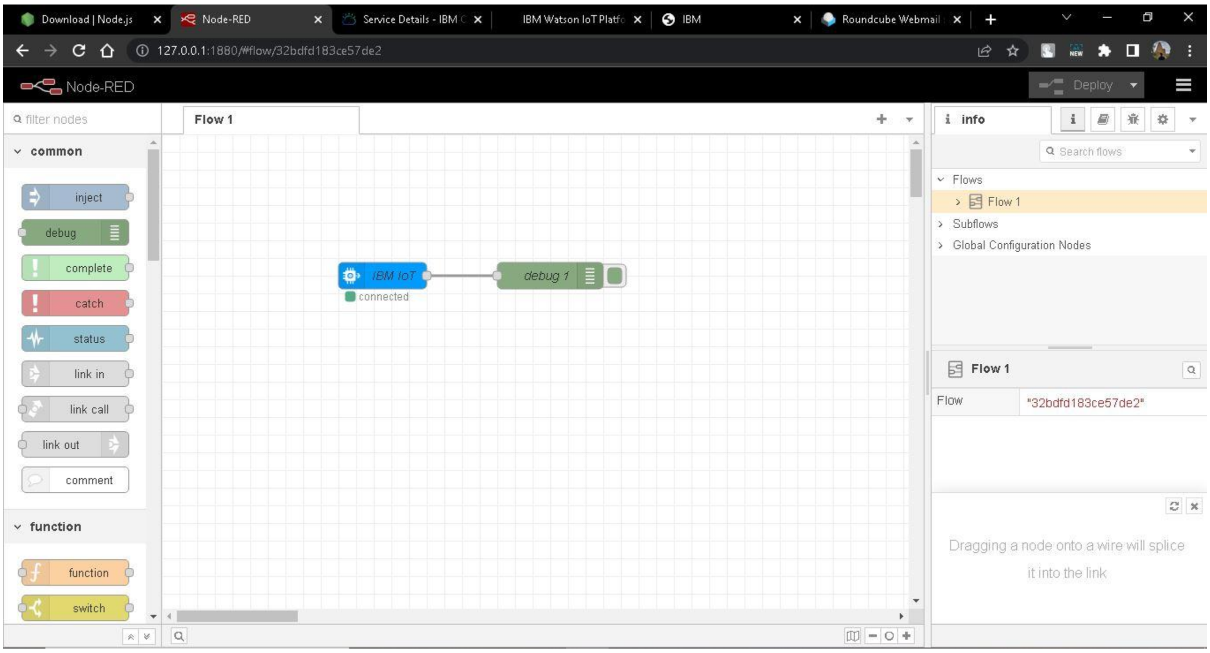
Name: IBM IoT

Service: registered

IBM IoT

Node	"f8c2eb4cf4fe5631"
Type	ibmiot in

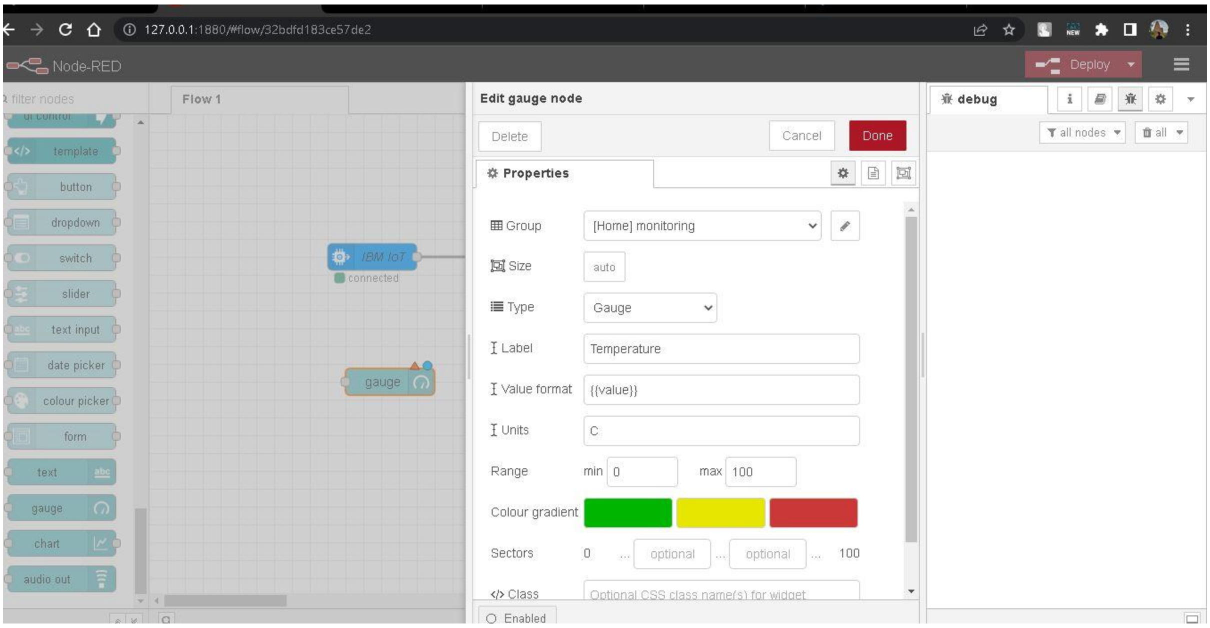
STEP 5: Connect Ibmiot in and debug 1 and deploy.



Flow 1

Flow "32bdfd183ce57de2"

STEP 6: Edit gauge node (here the gauge nodes are named as Temperature, pH and Turbidity).



Edit gauge node

Group: [Home] monitoring

Size: auto

Type: Gauge

Label: Temperature

Value format: {{value}}

Units: C

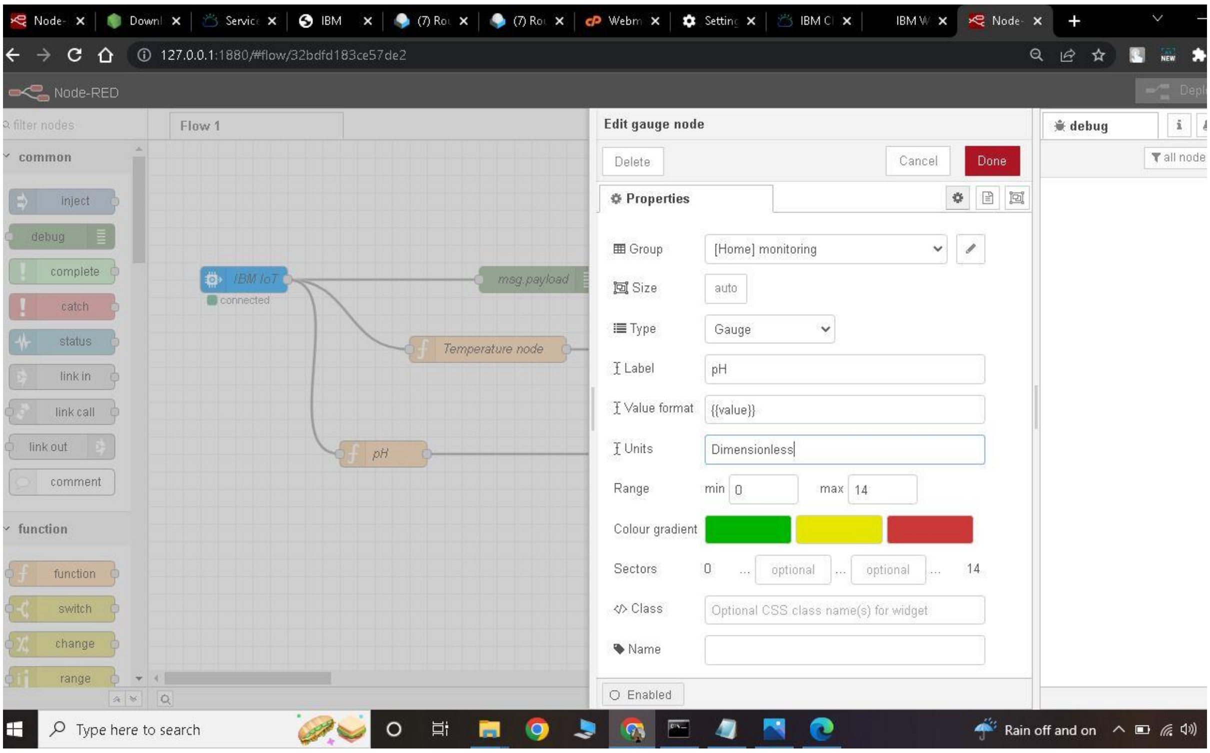
Range: min 0 max 100

Colour gradient: 🟩 🟨 🟥

Sectors: 0 ... optional ... optional ... 100

Class: Optional CSS class name(s) for widget

Fig 1



127.0.0.1:1880/#flow/32bdfd183ce57de2

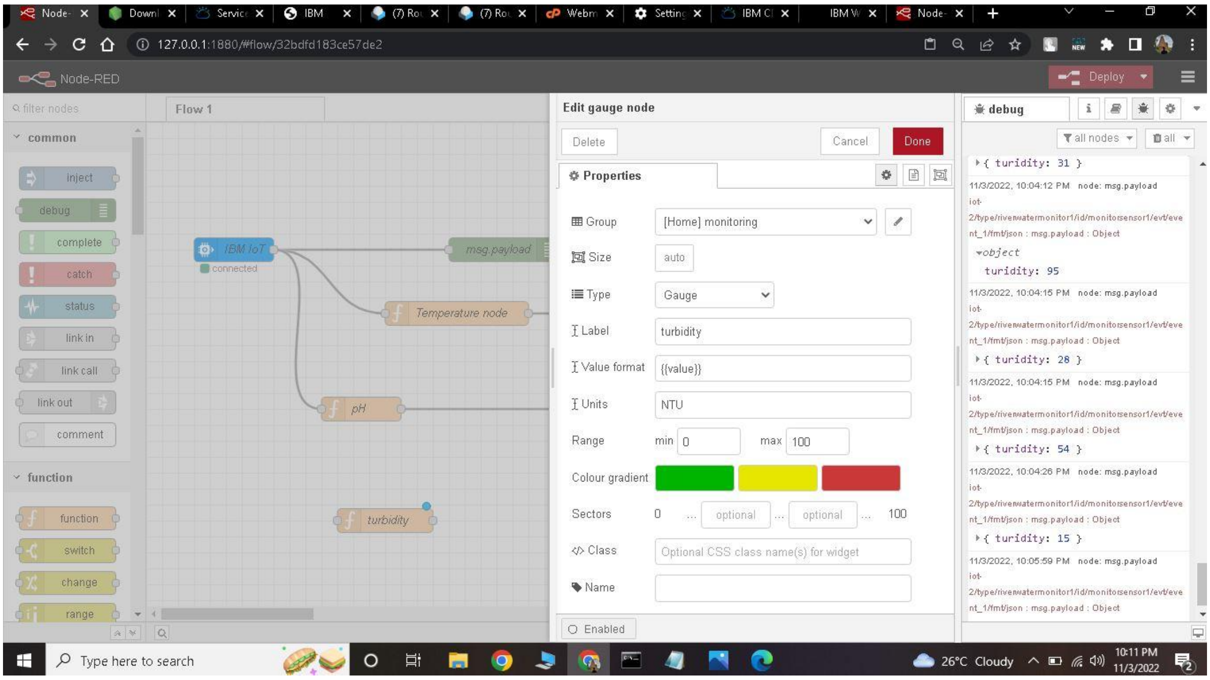
Edit gauge node

Delete Cancel Done

Properties

Group: [Home] monitoring
Size: auto
Type: Gauge
Label: pH
Value format: {{value}}
Units: Dimensionless
Range: min 0 max 14
Colour gradient: 🟩 🟨 🟥
Sectors: 0 ... optional ... optional ... 14
Class: Optional CSS class name(s) for widget
Name:
Enabled

Fig 2



127.0.0.1:1880/#flow/32bdfd183ce57de2

Edit gauge node

Delete Cancel Done

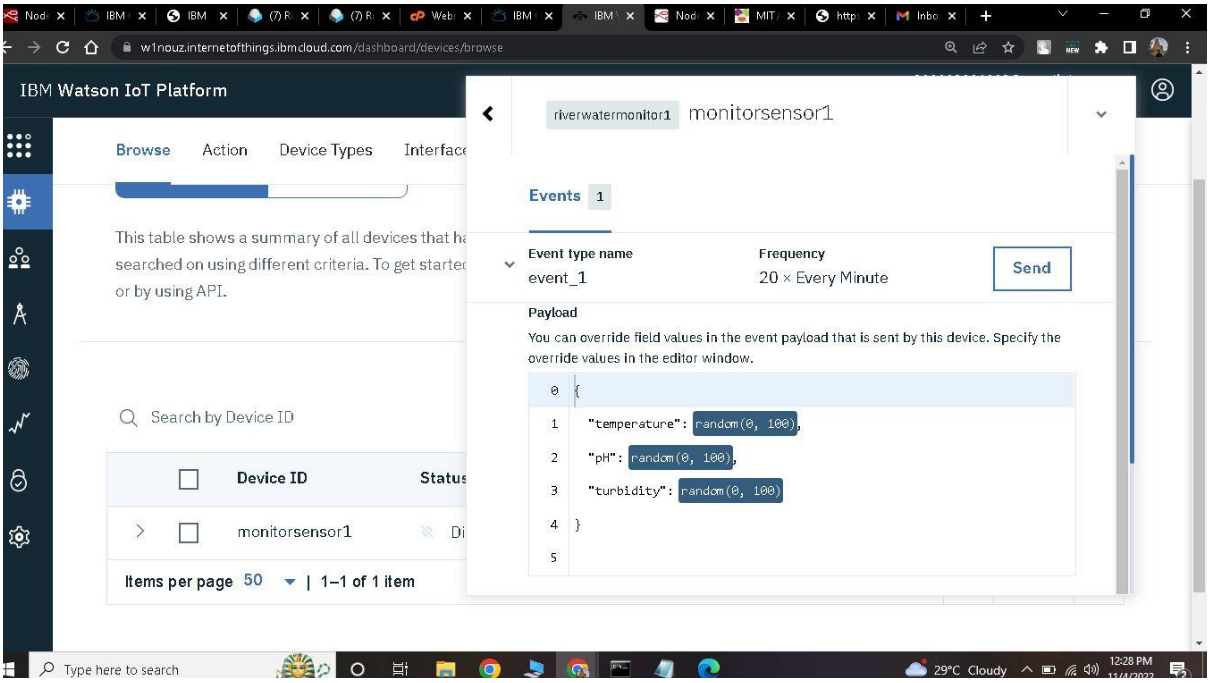
Properties

Group: [Home] monitoring
Size: auto
Type: Gauge
Label: turbidity
Value format: {{value}}
Units: NTU
Range: min 0 max 100
Colour gradient: 🟩 🟨 🟥
Sectors: 0 ... optional ... optional ... 100
Class: Optional CSS class name(s) for widget
Name:
Enabled

```
▸{ turidity: 31 }
11/3/2022, 10:04:12 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▾object
  turidity: 95
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 28 }
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 54 }
11/3/2022, 10:04:26 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 15 }
11/3/2022, 10:05:59 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
```

Fig 3

STEP 7: Simulated program to get the random values.



w1nouz.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

This table shows a summary of all devices that ha searched on using different criteria. To get started or by using API.

□	Device ID	Status
□	monitorsensor1	Di

Items per page 50 | 1–1 of 1 item

riverwatermonitor1 monitorsensor1

Events 1

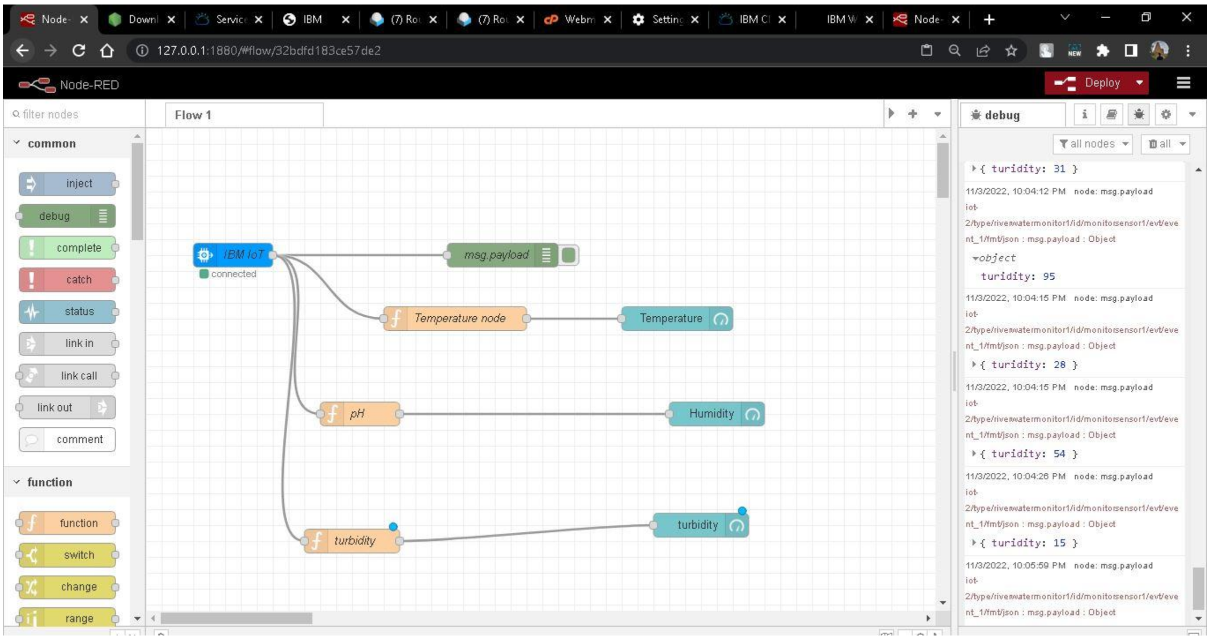
Event type name	Frequency
event_1	20 × Every Minute

Payload

You can override field values in the event payload that is sent by this device. Specify the override values in the editor window.

```
{
  "temperature": random(0, 100),
  "pH": random(0, 100),
  "turbidity": random(0, 100)
}
```

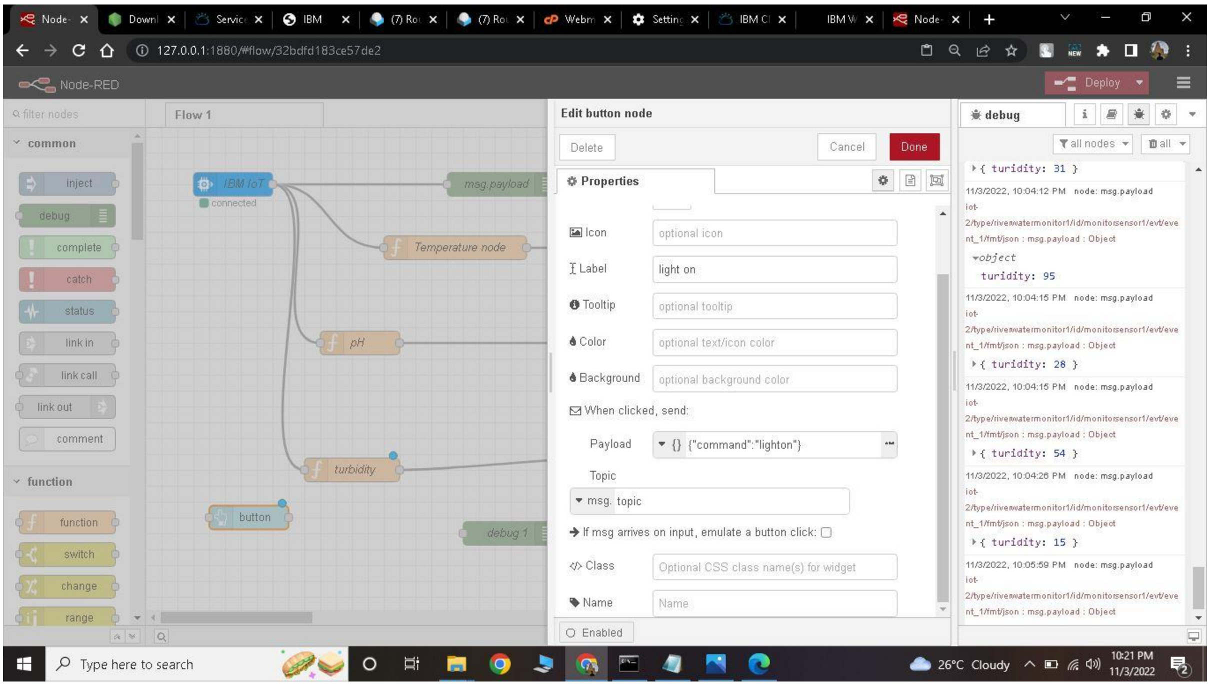
STEP 8: Generate debug message from IBM Watson IoT Platform and connect the nodes.



127.0.0.1:1880/#flow/32bdfd183ce57de2

```
▸{ turidity: 31 }
11/3/2022, 10:04:12 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▾object
  turidity: 95
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 28 }
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 54 }
11/3/2022, 10:04:26 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▸{ turidity: 15 }
11/3/2022, 10:05:59 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
```

STEP 9: Edit button mode [light ON and light OFF].



Edit button node

Delete | Cancel | Done

Properties

- Icon: optional icon
- Label: light on
- Tooltip: optional tooltip
- Color: optional text/icon color
- Background: optional background color
- When clicked, send:
  - Payload: {} {"command":"lighton"}
  - Topic: msg. topic
- If msg arrives on input, emulate a button click: □
- Class: Optional CSS class name(s) for widget
- Name: Name

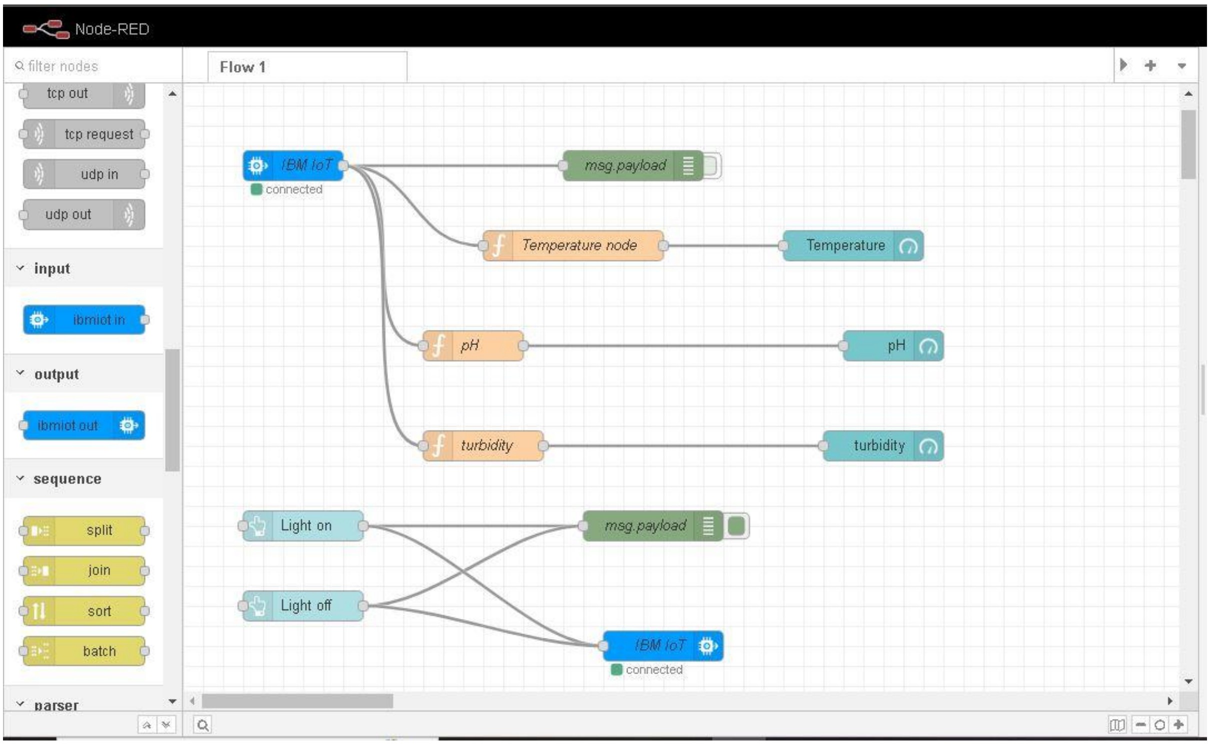
○ Enabled

debug

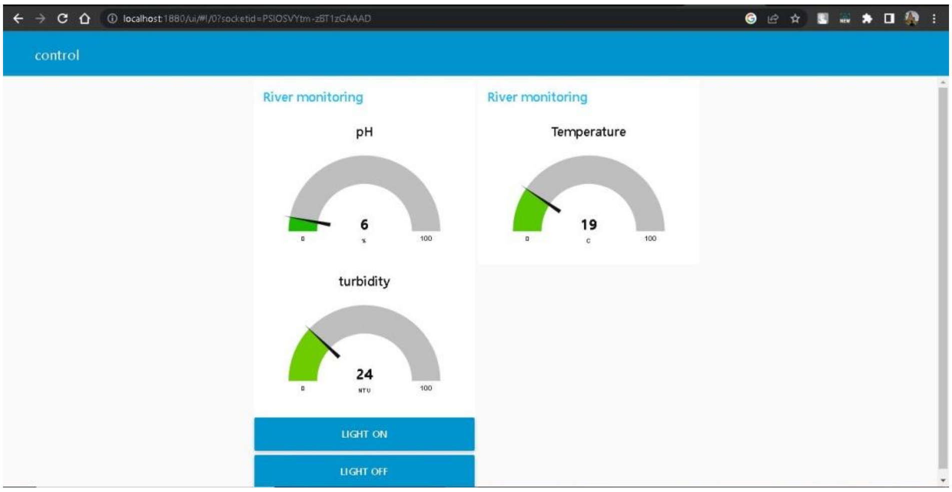
all nodes | all

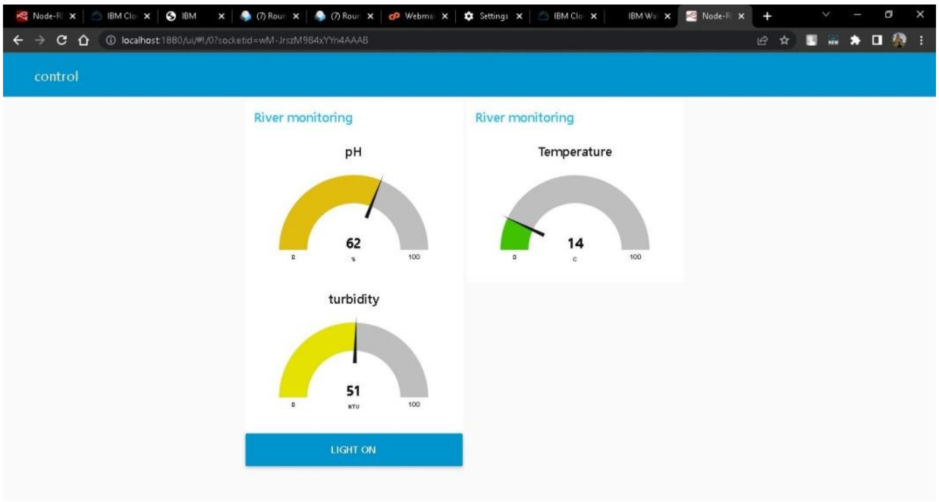
```
{ turidity: 31 }
11/3/2022, 10:04:12 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
▾object
  turidity: 95
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
{ turidity: 28 }
11/3/2022, 10:04:15 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
{ turidity: 54 }
11/3/2022, 10:04:26 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
{ turidity: 15 }
11/3/2022, 10:05:59 PM  node: msg.payload
iot-2/type/riverwatermonitor1/id/monitorsensor1/evt/event_1/fmt/json : msg.payload : Object
```

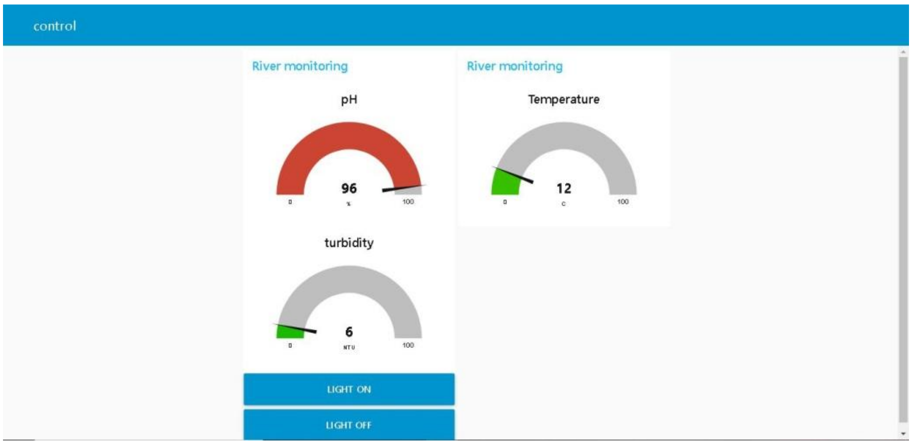
STEP 10: Entire flow diagram in Node-RED.



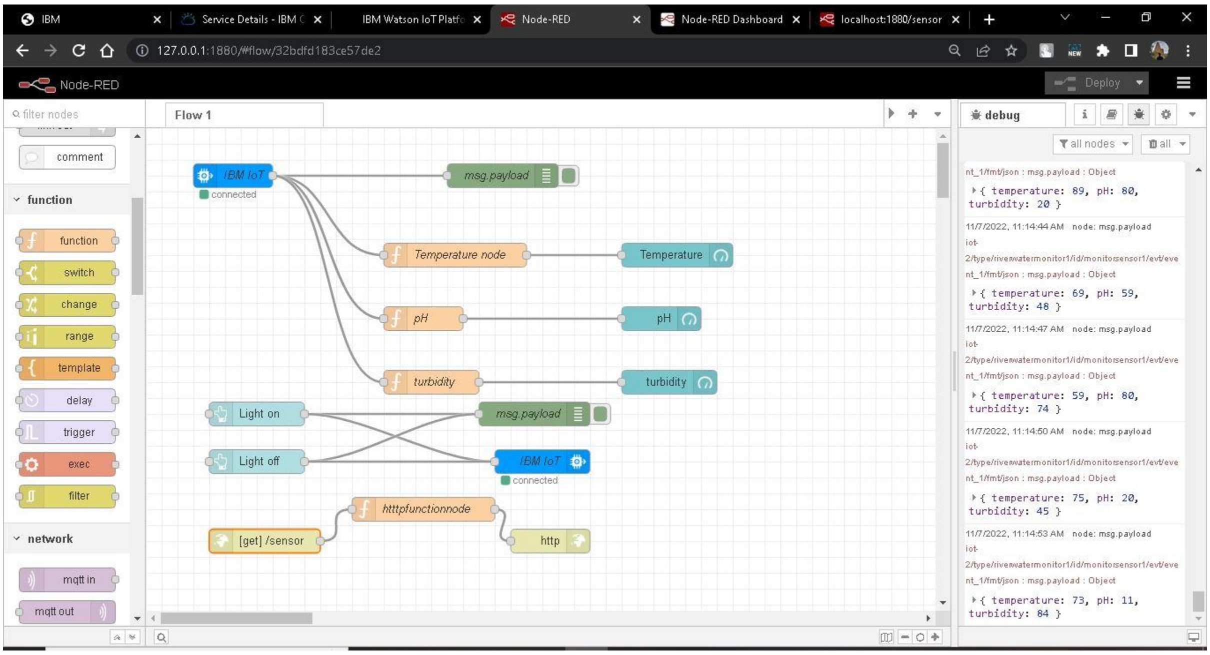
STEP 11: Generate the output from recent events.



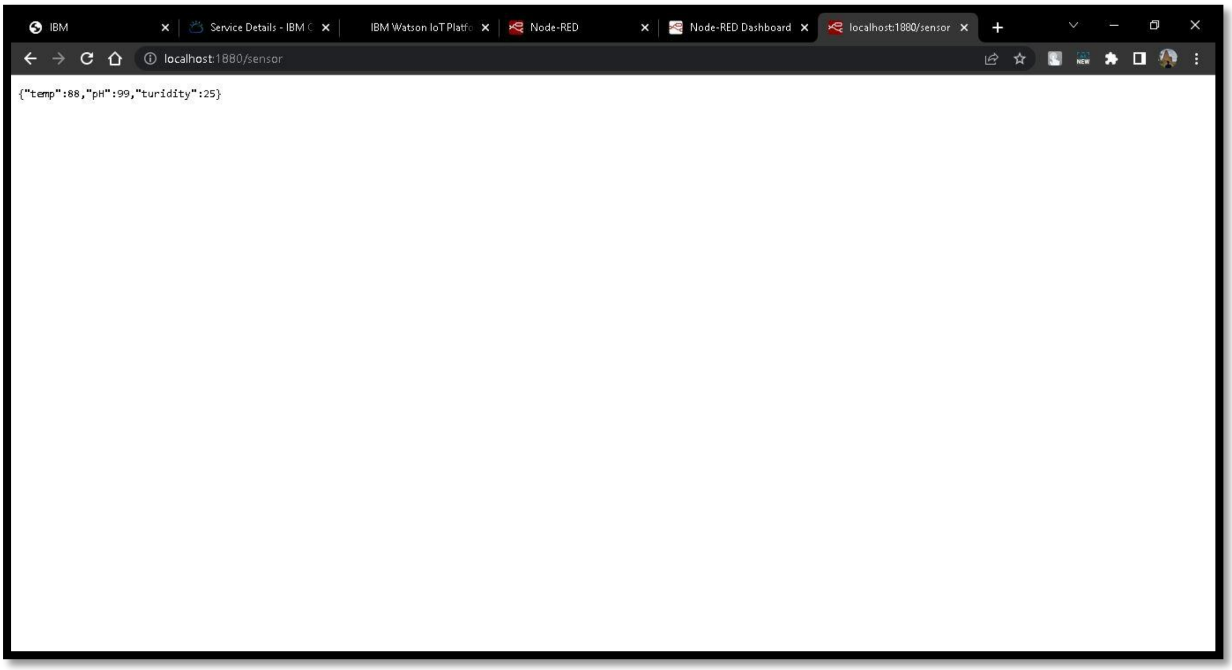




STEP 12: Implementing url in the function node to generate output.



```
nt_1/fmt/json : msg.payload : Object
 ▸{ temperature: 89, pH: 80,
turbidity: 20 }
11/7/2022, 11:14:44 AM   node: msg.payload
iot-
2/type/riverwatermonitor1/id/monitorsensor1/evt/eve
nt_1/fmt/json : msg.payload : Object
 ▸{ temperature: 69, pH: 59,
turbidity: 48 }
11/7/2022, 11:14:47 AM   node: msg.payload
iot-
2/type/riverwatermonitor1/id/monitorsensor1/evt/eve
nt_1/fmt/json : msg.payload : Object
 ▸{ temperature: 59, pH: 80,
turbidity: 74 }
11/7/2022, 11:14:50 AM   node: msg.payload
iot-
2/type/riverwatermonitor1/id/monitorsensor1/evt/eve
nt_1/fmt/json : msg.payload : Object
 ▸{ temperature: 75, pH: 20,
turbidity: 45 }
11/7/2022, 11:14:53 AM   node: msg.payload
iot-
2/type/riverwatermonitor1/id/monitorsensor1/evt/eve
nt_1/fmt/json : msg.payload : Object
 ▸{ temperature: 73, pH: 11,
turbidity: 84 }
```



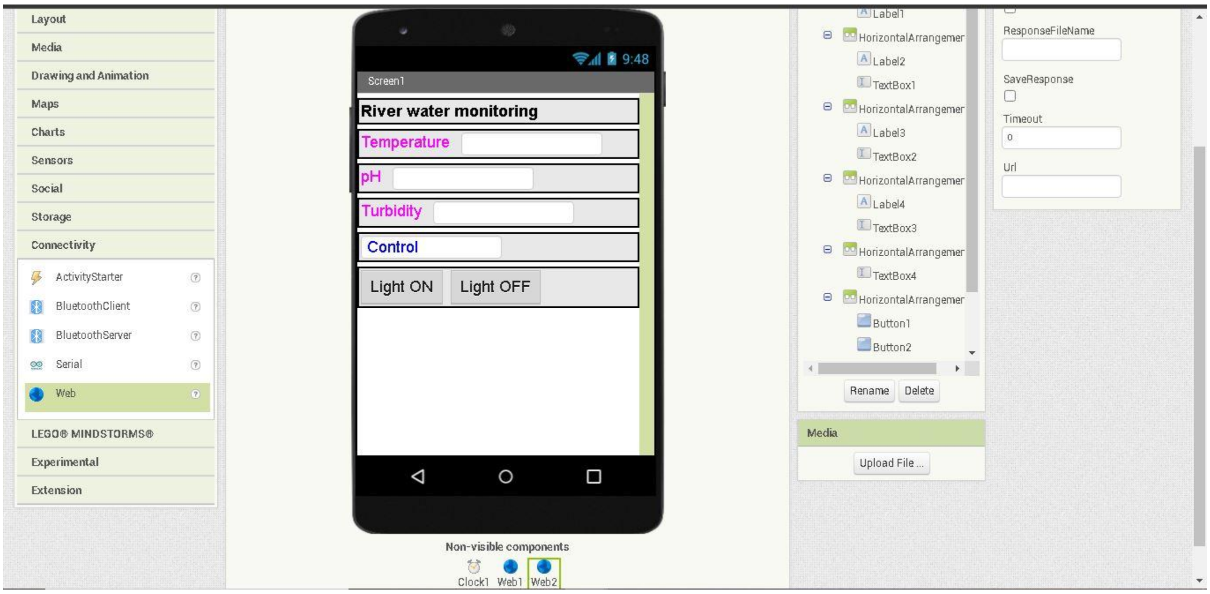
```
{"temp":88,"pH":99,"turidity":25}
```

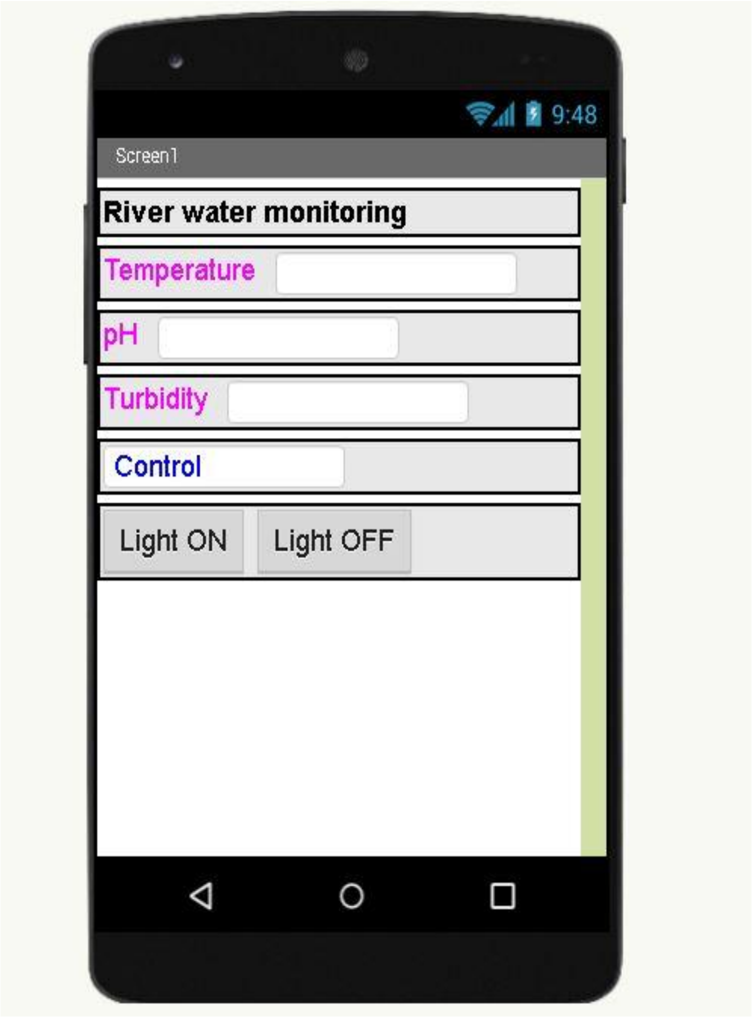
URL are:

localhost:1880/ui

localhost:1880/sensor

STEP 13: MIT app inverter to design the app.


Layout
Media
Drawing and Animation
Maps
Charts
Sensors
Social
Storage
Connectivity
ActivityStarter
BluetoothClient
BluetoothServer
Serial
Web
LEGO® MINDSTORMS®
Experimental
Extension
9:48
Screen1
River water monitoring
Temperature
pH
Turbidity
Control
Light ON
Light OFF
Non-visible components
Clock1
Web1
Web2
Label1
HorizontalArrangemer
Label2
TextBox1
HorizontalArrangemer
Label3
TextBox2
HorizontalArrangemer
Label4
TextBox3
HorizontalArrangemer
TextBox4
HorizontalArrangemer
Button1
Button2
Rename
Delete
Media
Upload File ...
ResponseFileName
SaveResponse
Timeout
0
Url


9:48
Screen1
River water monitoring
Temperature
pH
Turbidity
Control
Light ON
Light OFF