

# LABORATORY EXPERIMENT #25

Edge computing Node-RED – MQTT CSV  
backend



INTERNET OF THE THINGS

SOFTWARE DEVELOPMENT

PONCE DUARTE JOSE DE JESUS

UTT – 5C - 0322103790

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## **1      OBJECTIVE**

We will do a server on Red-Node and connect to a broker MQTT for receive messages.

## 2 DEVELOPMENT

### 3 (GAUGE AND HIGHCHARTS RED NODE) (Jua22)

#### 3.1 STARTING THE SERVER

```
npm install node-red-dashboard@3.6.5

C:\Users\josej>
C:\Users\josej>npm install -g --unsafe-perm node-red

added 312 packages in 44s

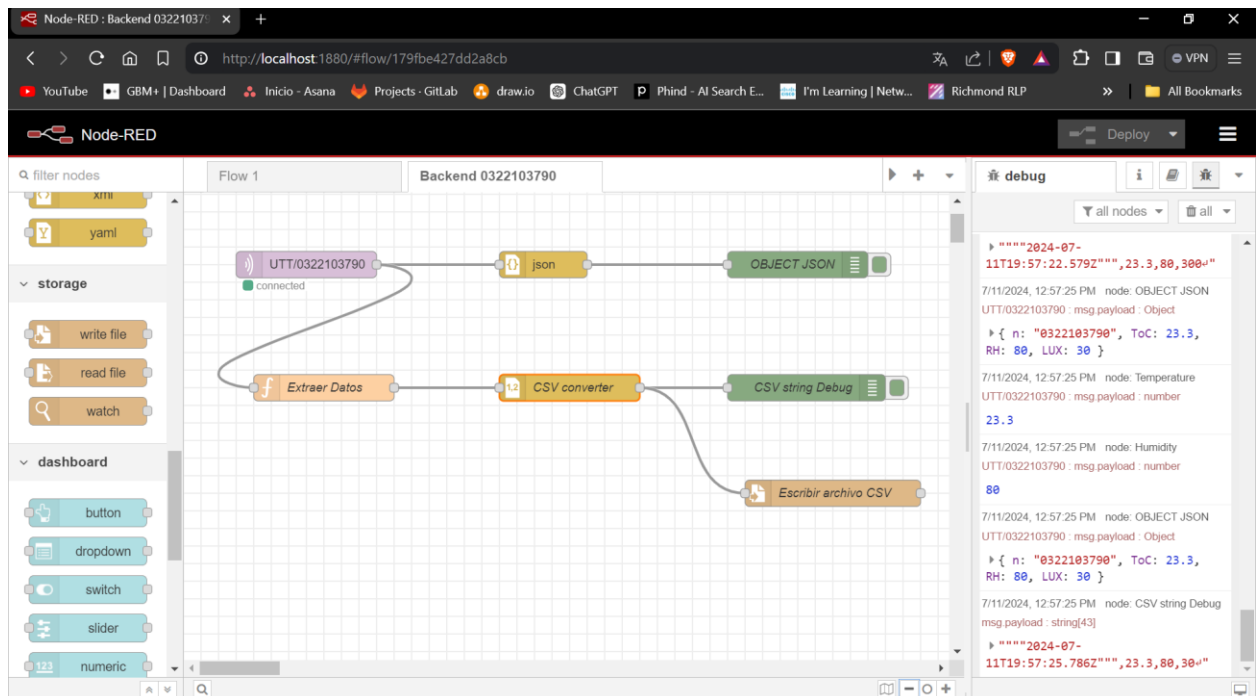
60 packages are looking for funding
  run `npm fund` for details

C:\Users\josej>node-red
10 Jul 11:15:11 - [info]

Welcome to Node-RED
=====

10 Jul 11:15:11 - [info] Node-RED version: v4.0.2
10 Jul 11:15:11 - [info] Node.js version: v22.1.0
10 Jul 11:15:11 - [info] Windows_NT 10.0.19045 x64 LE
(node:2096) [DEP0059] DeprecationWarning: The `util.log` API is deprecated. Please use console.log() with a custom format
ter or a third-party logger instead.
(Use `node --trace-deprecation ...` to show where the warning was created)
10 Jul 11:15:12 - [info] Loading palette nodes
(node:2096) [DEP0040] DeprecationWarning: The `punycode` module is deprecated. Please use a userland alternative instead
.
10 Jul 11:15:13 - [info] Settings file   : C:\Users\josej\.node-red\settings.js
10 Jul 11:15:13 - [info] Context store  : 'default' [module=memory]
10 Jul 11:15:13 - [info] User directory : C:\Users\josej\.node-red
10 Jul 11:15:13 - [warn] Projects disabled : editorTheme.projects.enabled=false
10 Jul 11:15:13 - [info] Flows file    : C:\Users\josej\.node-red\flows.json
10 Jul 11:15:13 - [info] Creating new flow file
```

#### 3.2 OPENING DE RED-NODE AND CONFIGURING THE NODES



Node-RED interface showing the "Edit function node" configuration for a function named "Extraer Datos". The function code is as follows:

```
4 var humidity = msg.payload.RH;
5 var light = msg.payload.LUX;
6 var date_time = new Date(timestamp);
7 var m = {
8   'timestamp': date_time,
9   'Temperature': temperature,
10  'Humidity': humidity,
11  'Light': light
12 };
13 return {payload:m};
```

The debug console shows the following log entries:

```
7/11/2024, 12:57:25 PM node: OBJECT JSON
UTT/0322103790 : msg.payload : Object
{ n: "0322103790", ToC: 23.3,
RH: 80, LUX: 30 }
7/11/2024, 12:57:25 PM node: Temperature
UTT/0322103790 : msg.payload : number
23.3
7/11/2024, 12:57:25 PM node: Humidity
UTT/0322103790 : msg.payload : number
80
7/11/2024, 12:57:25 PM node: OBJECT JSON
UTT/0322103790 : msg.payload : Object
{ n: "0322103790", ToC: 23.3,
RH: 80, LUX: 30 }
7/11/2024, 12:57:25 PM node: CSV string Debug
msg.payload : string[43]
""2024-07-11T19:57:22.579Z"",23.3,80,30"
```

Node-RED interface showing the "Edit csv node" configuration for a node named "CSV converter". The configuration is as follows:

- Columns: timestamp, Temperature, Humidity, Light
- Separator: comma
- Parser: Legacy
- Name: CSV converter
- CSV to Object options: Input, Skip first 0 lines, first row contains column names

The debug console shows the following log entries:

```
7/11/2024, 12:57:25 PM node: OBJECT JSON
UTT/0322103790 : msg.payload : Object
{ n: "0322103790", ToC: 23.3,
RH: 80, LUX: 30 }
7/11/2024, 12:57:25 PM node: Temperature
UTT/0322103790 : msg.payload : number
23.3
7/11/2024, 12:57:25 PM node: Humidity
UTT/0322103790 : msg.payload : number
80
7/11/2024, 12:57:25 PM node: OBJECT JSON
UTT/0322103790 : msg.payload : Object
{ n: "0322103790", ToC: 23.3,
RH: 80, LUX: 30 }
7/11/2024, 12:57:25 PM node: CSV string Debug
msg.payload : string[43]
""2024-07-11T19:57:22.579Z"",23.3,80,30"
```

Node-RED

filter nodes

Flow 1

Back

storage

write file

read file

watch

dashboard

button

dropdown

switch

slider

numeric

UTT/0322103790

connected

Extraer Datos

Edit write file node

Delete

Cancel

Done

Properties

Filename

path C:\PC\School\UTT\_TSU\5to\IOT\3th\Lab25\inc

Action

append to file

Add newline (ln) to each payload?

Create directory if it doesn't exist?

Encoding

utf8

Name

Escribir archivo CSV

Tip: The filename should be an absolute path, otherwise it will be relative to the working directory of the Node-RED process.

Enabled

debug

all nodes

all

7/11/2024, 12:57:25 PM node: OBJECT JSON

UTT/0322103790 : msg.payload : Object

{ n: "0322103790", ToC: 23.3, RH: 80, LUX: 30 }

7/11/2024, 12:57:25 PM node: Temperature

UTT/0322103790 : msg.payload : number

23.3

7/11/2024, 12:57:25 PM node: Humidity

UTT/0322103790 : msg.payload : number

80

7/11/2024, 12:57:25 PM node: OBJECT JSON

UTT/0322103790 : msg.payload : Object

{ n: "0322103790", ToC: 23.3, RH: 80, LUX: 30 }

7/11/2024, 12:57:25 PM node: CSV string Debug

msg.payload : string[43]

2024-07-11T19:57:25.786Z,23.3,80,30

### 3.3 Getting values on the csv file

node_032210370.csv				
3th > Lab25 > node_032210370.csv				
	A	B	C	D
1	timestamp	Temperat...	Humid...	Light
2	"2024-07-11T19:51:32.236Z"			
3	"2024-07-11T19:51:35.711Z"			
4	"2024-07-11T19:51:36.908Z"			
5	timestamp	Temperature	Humidity	Light
6	"2024-07-11T19:57:14.944Z"	22.3	80	300
7	"2024-07-11T19:57:16.865Z"	22.3	80	300
8	"2024-07-11T19:57:17.490Z"	22.3	80	300
9	"2024-07-11T19:57:22.579Z"	23.3	80	300
10	"2024-07-11T19:57:25.786Z"	23.3	80	30

## 3.4 CONFIGURING THE BROKER

The screenshot displays the MQTTBox application interface. At the top, the title bar reads "MQTTBox" with standard window controls. Below the title bar, a menu bar includes "MQTTBox", "Edit", and "Help". A toolbar contains a "Menu" button, a "Connected" status indicator (showing a signal strength icon), and buttons for "Add publisher" and "Add subscriber".

The main interface is divided into two primary sections. On the left, the "MQTT SERVER - mqtt://broker.hivemq.com" panel contains the following fields and controls:

- Topic to publish:** A text input field containing "UTT/0322103790".
- QoS:** A dropdown menu set to "0 - Almost Once".
- Retain:** A checkbox that is currently unchecked.
- Payload Type:** A dropdown menu set to "Strings / JSON / XML / Characters".
- e.g.:** A text input field containing "{hello:'world'}".
- Payload:** A text input field containing "{n:0322103790,ToC:23.3,RH:80,LUX:300}".
- Publish:** A blue button to initiate the message publishing.

Below the "Publish" button, a preview of the outgoing message is shown:

```
{n:0322103790,ToC:23.3,RH:80,LUX:300}
topic:UTT/0322103790,qos:0,retain:false
```

On the right, a panel titled "UTT/0322103790" displays the received message details:

```
{n:0322103790,ToC:23.3,RH:80,LUX:300}

qos : 0, retain : false, cmd : publish, dup : false, to
pic : UTT/0322103790, messageid : , length : 63,
Raw payload : 12334110345834485150504948515557
483444348411167345850514651443482723458564844
323476858834585148125
```

Below this, another message is shown with a different payload:

```
{n:0322103790,ToC:23.3,RH:80,LUX:300}

qos : 0, retain : false, cmd : publish, dup : false, to
pic : UTT/0322103790, messageid : , length : 64,
Raw payload : 12334110345834485150504948515557
483444348411167345850514651443482723458564844
32347685883458514848125
```

At the bottom, a third message is partially visible:

```
{n:0322103790,ToC:22.3,RH:80,LUX:300}

qos : 0, retain : false, cmd : publish, dup : false, to
```



#### **4 CONCLUSION / COMENTARY**

With this, we learned how to implement another way to show and save all the values on a plane text csv.

