MUHAMMAD MEMON

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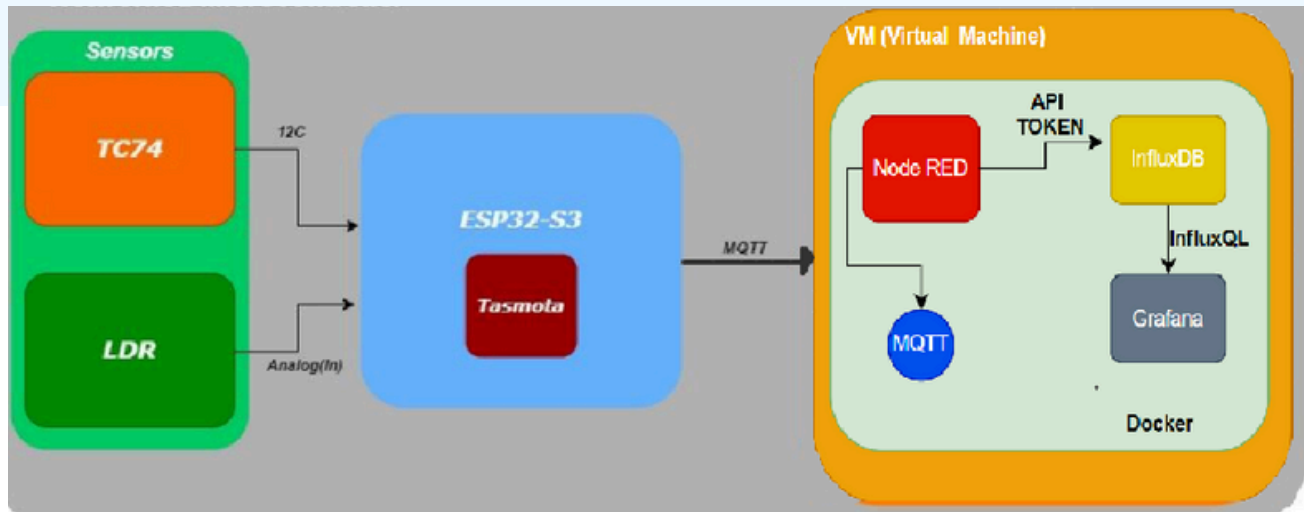in linkedin.com/in/muhammadmemon

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3RD YEAR MINI PROJECT - SEMESTER 1 ✓

What?

- Developed a network micro-controller system leveraging Tasmota for interfacing with electronic technologies like I2C, SPI, and serial communication.
- Utilized Microsoft Azure Cloud Service for backend cloud integration and state management.
- ESP8266 chip used for the projects IoT capabilities, then upgraded to an ESP32-S3 chip for enhanced Wi-Fi connectivity.
- Integrated TC74 temperature sensor and LDR sensor with Tasmota, connecting to software tools like Node-RED, Grafana, and Influx DB for data management.

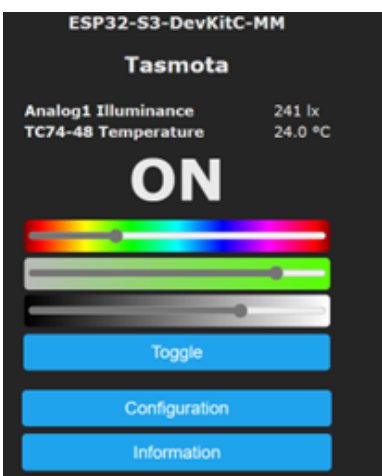## 3RD YEAR MINI PROJECT - SEMESTER 1 ✕

What?

Tasmota Configuration:

- Tasmota is an open-source platform based on devices which it allows smart devices to communicate to wireless network protocol called MQTT.

How?

- The Tasmota configuration was done by configuring the ESP tool commands and the ESP bin file and using the Termite which is a serial terminal program for Windows Operating System.

Results

- Using the Tasmota WI-FI IP address, Configuring the settings to match the LDR and TC74 sesnors, which will show accurate results of sensors of the home screen of the tasmota.

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320	MQTT	1883
340	Grafana	3000
350	Portainer	9000
360	AllowAnyCustom80Inbound	80
380	inFluxdb	8086
390	NodeRed	1880

```
. Connected
>: Web server active on tasmota-3CFA24-6692 with IP address 192.168.1.97
P: Attempting connection...
P: Connected
P: tele/tasmota_3CFA24/LWT = Online (retained)
P: cmnd/tasmota_3CFA24/POWER =
P: tele/tasmota_3CFA24/INFO1 = {"Info1":{"Module":"ESP32-S3-DevKitC-1-JS","V
P: tele/tasmota_3CFA24/INFO2 = {"Info2":{"WebServerMode":"Admin","Hostname
P: tele/tasmota_3CFA24/INFO3 = {"Info3":{"RestartReason":"Usb uart reset digital
P: stat/tasmota_3CFA24/RESULT = {"POWER":"ON"}
P: stat/tasmota_3CFA24/POWER = ON
```
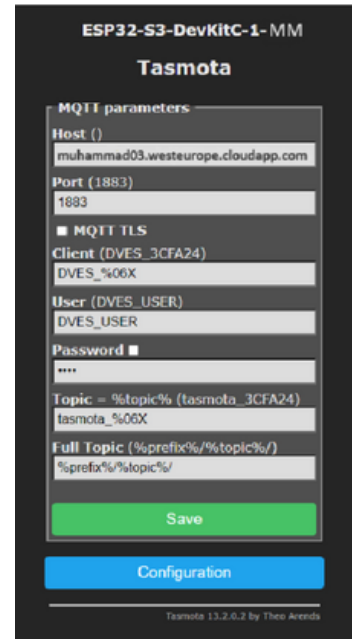
What?

MQTT Configuration

- MQTT is a message protocol or collection of rules for machine-to-machine communication. It works with Smart sensors, wearables, and other Internet of Things (IoT) devices.

How?

- Using a Mosquitto server on Microsoft Azure, the MQTT setup was set up as a broker. The DNS name from Azure was copied onto Tasmota's Host() function, this connection enables Tasmota to send and receive messages in real time, as well as remote device administration.

ESP32-S3-DevKitC-1-MM

Tasmota

MQTT parameters

Host ()
muhammad03.westeurope.cloudapp.com

Port (1883)
1883

■ MQTT TLS

Client (DVES_3CFA24)
DVES_%06X

User (DVES_USER)
DVES_USER

Password ■
••••

Topic = %topic% (tasmota_3CFA24)
tasmota_%06X

Full Topic (%prefix%/%topic%/)
%prefix%/%topic%/

Save

Configuration

Tasmota 13.2.0.2 by Theo Arends

Results

- Using the networking ports on Microsoft Azure and the console on Tasmota, the MQTT parameters were successfully connected.

What?

Node Red Configuration

- Node Red is a programming tool that works with hardware devices like the ESP8266/32-s3. It is a browsing network editor that allows you to write nodes in a palette with only one click.
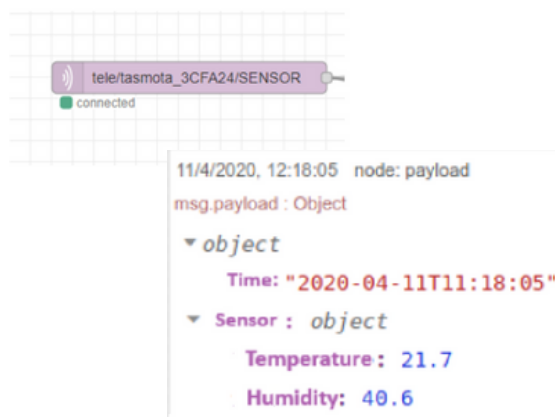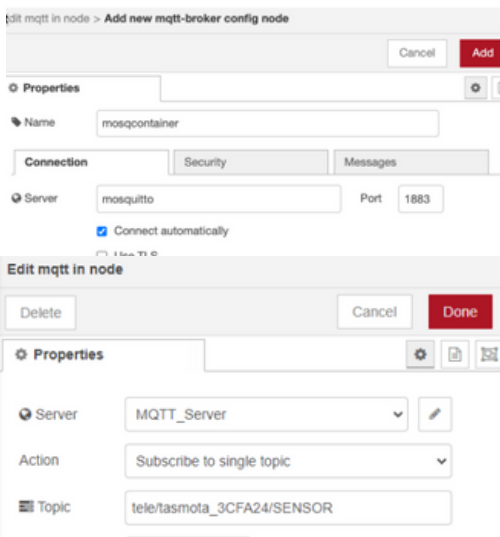
How?

- To load NodeRed, type "muhammad03.westeurope.cloudapp.com:1800" into the search bar.
- The topic was set to "tele/tasmota_3CFA24/SENSOR" to facilitate tasmota sensor and MQTT connections.
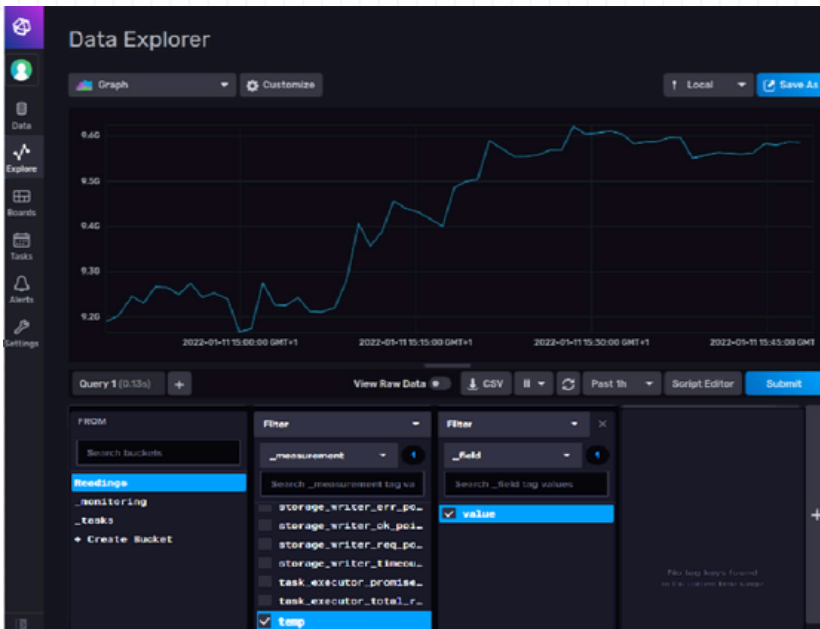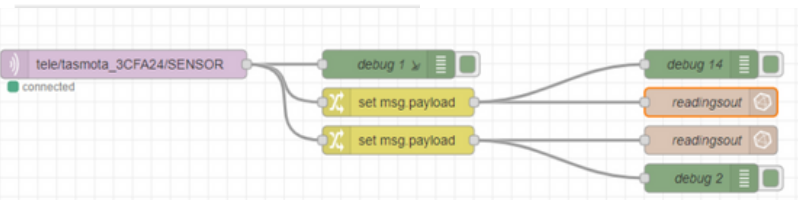
Result?

- Using this topic and all MQTT connections from the port, tasmota, and Microsoft Azure, the connection is established successfully.

tele/tasmota_3CFA24/SENSOR
■ connected

```
11/4/2020, 12:18:05  node: payload
msg.payload : Object
▼ object
     Time: "2020-04-11T11:18:05"
  ▼ Sensor : object
        Temperature : 21.7
        Humidity: 40.6
```

3RD YEAR MINI PROJECT - SEMESTER 1

What?

Influxdb Configuration

- Influx DB is an open-source time series database developed by the company Influx Data. It is used for storage and retrieval of time series data in fields such as operations monitoring, application metrics, Internet of Things sensor data, and real-time analytics. I used Influx dB to store my sensor data because it works in random with both my Node-RED which sends the data values that it receives through MQTT to Influx using API tokens

How?

- To connect to Influxdb, type "muhammad03.westeurope.cloudapp.com:8086" into the search bar.
- The topic was set to "tele/tasmota_3CFA24/SENSOR" to facilitate tasmota sensor,MQTT connections,username,password and buckets name and API Tokens.
- After installing the InfluxDB node in Node-RED using the palette, I set it up with the bucket token to transfer sensor data (lux and temperature measurements) from MQTT messages directly to InfluxDB.

Results

- Using the API Tokens, InfluxDB was successfully configured in Node-RED. The graph displays the results from the TC74 and LUX (LDR) sensors, indicating that temperature and humidity vary with changes in temperature and light levels.

3RD YEAR MINI PROJECT - SEMESTER 1

What?

Grafana Configuration

- Grafana is a open-source analytics and interactive visualization web application, accessible across multiple platforms. When connected to supported data sources. Grafana integrates with InfluxDB, forming a powerful combination for data visualization and analysis

How?

- To access Influxdb, type "muhammad03.westeurope.cloudapp.com:9000" into the search bar.
- The Grafana topic was configured using the "InfluxDB username, password," and API tokens to enable InfluxDB queries and generate visual graphs in Grafana.

```
from(bucket: "Readings")
  |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
  |> filter(fn: (r) => r["_measurement"] == "lux")
  |> filter(fn: (r) => r["_field"] == "value")
  |> aggregateWindow(every: v.windowPeriod, fn: last, createEmpty: false)
  |> yield(name: "last")
```


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