

# **LAPORAN PRAKTIKUM MINGGU KE-13**

**Smart Device Configuration**

**INTERNET OF THINGS**



Disusun oleh:

**Omar Abdul-Raoof Taha Ghaleb Al-Maktary**

**1941720237**

**TI-3H**

**D4 TEKNIK INFORMATIKA**

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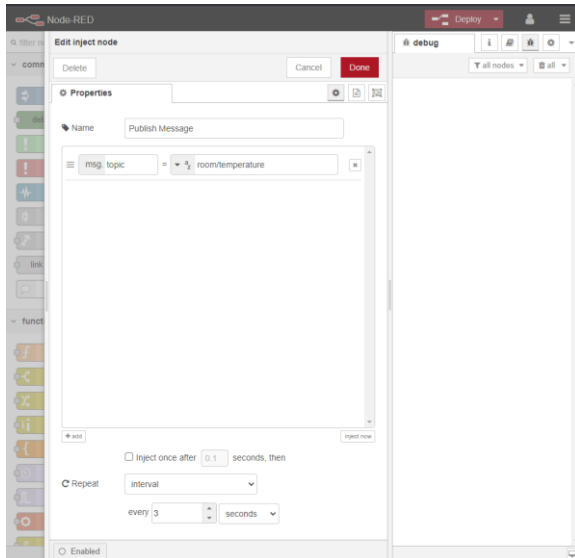
**2022**

# LAPORAN

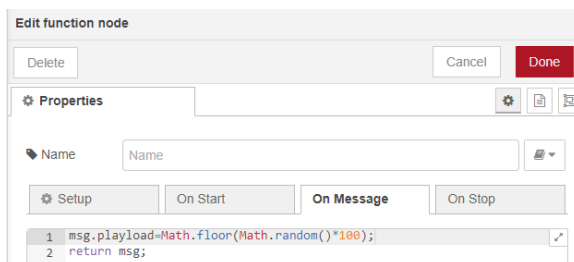
## A. PRAKTIKUM

First step:

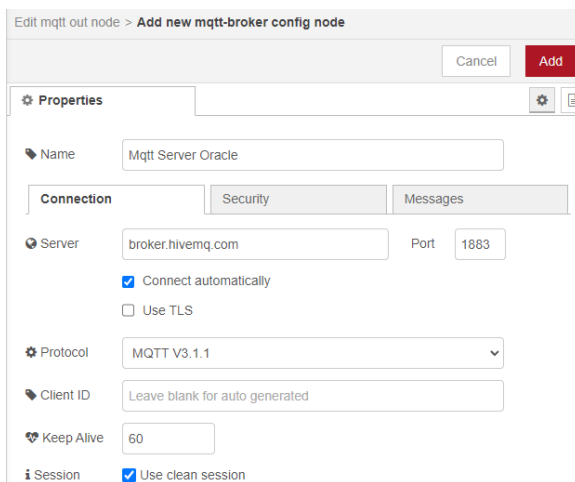
Create an inject node in the flowsheet as the following:



Next is to create a new function:



And then create a MQTT protocol out node with the following configuration:



**Edit mqtt out node**

Delete Cancel Done

**Properties**

Server: Mqtt Server Oracle

Topic: room/temperature

QoS: 2 Retain:

Name: sample publisher

Tip: Leave topic, qos or retain blank if you want to set them via msg properties.

Create a MQTT protocol in node:

**Edit mqtt in node**

Delete Cancel Done

**Properties**

Server: Mqtt Server Oracle

Action: Subscribe to single topic

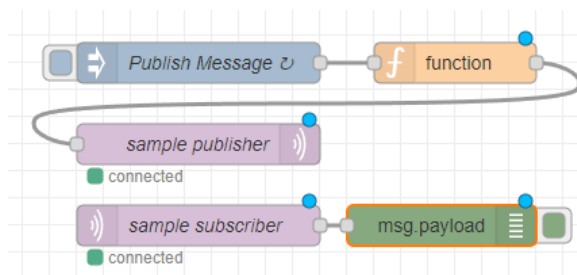
Topic: room/temperature

QoS: 2

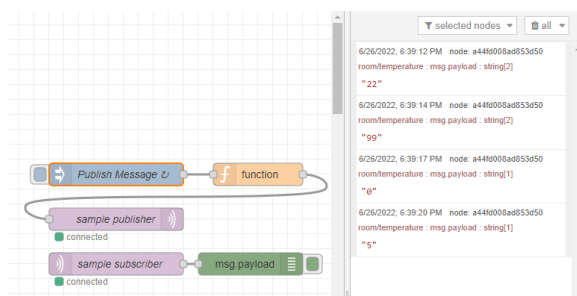
Output: auto-detect (string or buffer)

Name: sample subscriber

Connect nodes:



Results:



## Question

- On the inject node, in the Repeat property with an interval value. What is its function?

The function is to repeat the request every 3 seconds.

- What is the line of code `msg.payload=Math.floor(Math.random()*100);`?

To produce random integer numbers.

- The node part is mqtt out, what is the QoS function with a value of 2?

(QoS) in MQTT messaging is an agreement between sender and receiver on the guarantee of delivering a message. There are three levels of QoS: 0 - at most once. 1 - at least once. 2 - exactly once

Next practicum is to connect to a smart device:

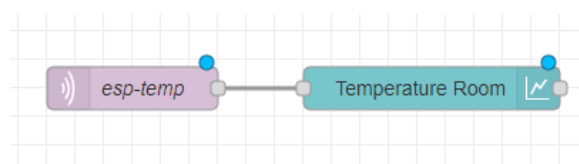
Create a new MQTT protocol in node in a new flow with the following configuration:

The screenshot shows the 'Edit mqtt in node' configuration window. It has a title bar 'Edit mqtt in node' and buttons for 'Delete', 'Cancel', and 'Done'. Below the title bar is a 'Properties' tab. The configuration fields are: 'Server' set to 'Mqtt Server Oracle', 'Action' set to 'Subscribe to single topic', 'Topic' set to 'room/temperature', 'QoS' set to '2', 'Output' set to 'auto-detect (string or buffer)', and 'Name' set to 'esp-temp'.

Create a new tab named node-red dashboard that has a group with the Room name.

Create a chart node with the following configuration:

The screenshot shows the 'Edit chart node' configuration window. It has a title bar 'Edit chart node' and buttons for 'Delete', 'Cancel', and 'Done'. Below the title bar is a 'Properties' tab. The configuration fields are: 'Group' set to '[Node-RED Dashboard] Room', 'Size' set to 'auto', 'Label' set to 'Temperature Room', 'Type' set to 'Line chart', 'enlarge points' checked, 'X-axis' set to 'last 1 hours OR 1000 points', 'X-axis Label' set to 'HH:mm:ss', 'Y-axis' set to 'min -50 max 50', 'Legend' set to 'None', 'Interpolate' set to 'linear', 'Series Colours' set to a 3x3 grid of colors, 'Blank label' set to 'display this text before valid data arrives', 'Class' set to 'Optional CSS class name(s) for widget', and 'Name' set to 'Name'. To the right of the configuration window is a preview of the dashboard showing a tab named 'node-red dashboard' with a group named 'Room'.



CODE the project:

```
#include <Arduino.h>
#include <ESP8266WiFi.h>
#include <PubSubClient.h>
#include <SimpleDHT.h>

const char *ssid = "WI-FI name";
const char *password = "PASSWORD";
const char *mqtt_server = "broker.hivemq.com";

WiFiClient espClient;
PubSubClient client(espClient);

SimpleDHT11 dht11(D7);

Long now = millis();
Long lastMeasure = 0;
String macAddr = "";

void setup_wifi()
{
    delay(10);
    Serial.println();
    Serial.print("Connecting to ");
    Serial.println(ssid);
    WiFi.begin(ssid, password);
    while (WiFi.status() != WL_CONNECTED)
    {
        delay(500);
        Serial.print(".");
    }
    Serial.println("");
    Serial.print("WiFi connected - ESP IP address: ");
    Serial.println(WiFi.localIP());
    macAddr = WiFi.macAddress();
    Serial.println(macAddr);
}

void reconnect()
{
    while (!client.connected())
    {
        Serial.print("Attempting MQTT connection...");
        if (client.connect(macAddr.c_str()))
        {
            Serial.println("connected");
        }
        else
```

```

    {
        Serial.print("failed, rc=");
        Serial.print(client.state());
        Serial.println(" try again in 5 seconds");
        delay(5000);
    }
}

void setup()
{
    Serial.begin(9600);
    Serial.println("MQTT Node-RED");
    setup_wifi();
    client.setServer(mqtt_server, 1883);
}

void loop()
{
    if (!client.connected())
    {
        reconnect();
    }
    if (!client.loop())
    {
        client.connect(macAddr.c_str());
    }
    now = millis();
    if (now - lastMeasure > 5000)
    {
        lastMeasure = now;
        int err = SimpleDHTErrSuccess;

        byte temperature = 0;
        byte humidity = 0;
        if ((err = dht11.read(&temperature, &humidity, NULL)) !=
SimpleDHTErrSuccess)
        {
            Serial.print("Reading DHT11 failed, err=");
            Serial.println(err);
            delay(1000);
            return;
        }
        static char temperatureTemp[7];
        dtostrf(temperature, 4, 2, temperatureTemp);
        Serial.println(temperatureTemp);

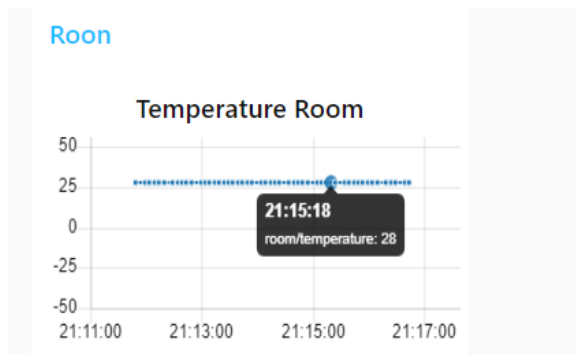
        client.publish("room/temperature", temperatureTemp);
    }
}

```

```
}
}
```

## RESULTS:

```
MQTT Node-RED
Connecting to P.TRIS
.....
WiFi connected - ESP IP address: 192.168.100.70
44:17:93:20:03:CC
Attempting MQTT connection...connected
28.00
28.00
28.00
28.00
```



## Question

- Modify the program in ESP8266 above so that you can subscribe with the topic room/lamp?
- Add the code above so that you can publish the humidity value with the topic room/humadity?
- Add a node chart so that it can display humidity values, the node chart is still in one group, namely Room on the Node-RED dashboard.

