

A man with a beard and glasses, wearing a light blue shirt and dark trousers, is sitting on a white, fluffy cloud. He is holding a smartphone in his right hand and looking at it. He has earbuds in his ears. Surrounding him is a network of white lines and circular icons on a blue background. The icons include a Facebook 'f' logo, a play button, a family of three, a camera, an airplane, a bank building, a lightbulb, a Twitter bird, a musical note, and a person icon. The background also features a faint world map.

Riset Berbasis Cloud Internet of Things (IoT)

Dr. Basuki Rahmat, S.Si, MT

Agenda

- Apakah IoT - Arsitektur dan Sistemnya
- Riset Berbasis Cloud IoT
 - thingspeak.com
 - cloudmqtt.com
 - i-ot.net
- Demo

Apakah IoT?

Internet of Things (IoT) adalah area yang muncul di mana milyaran objek pintar saling berhubungan satu sama lain menggunakan internet untuk berbagi data dan sumber daya

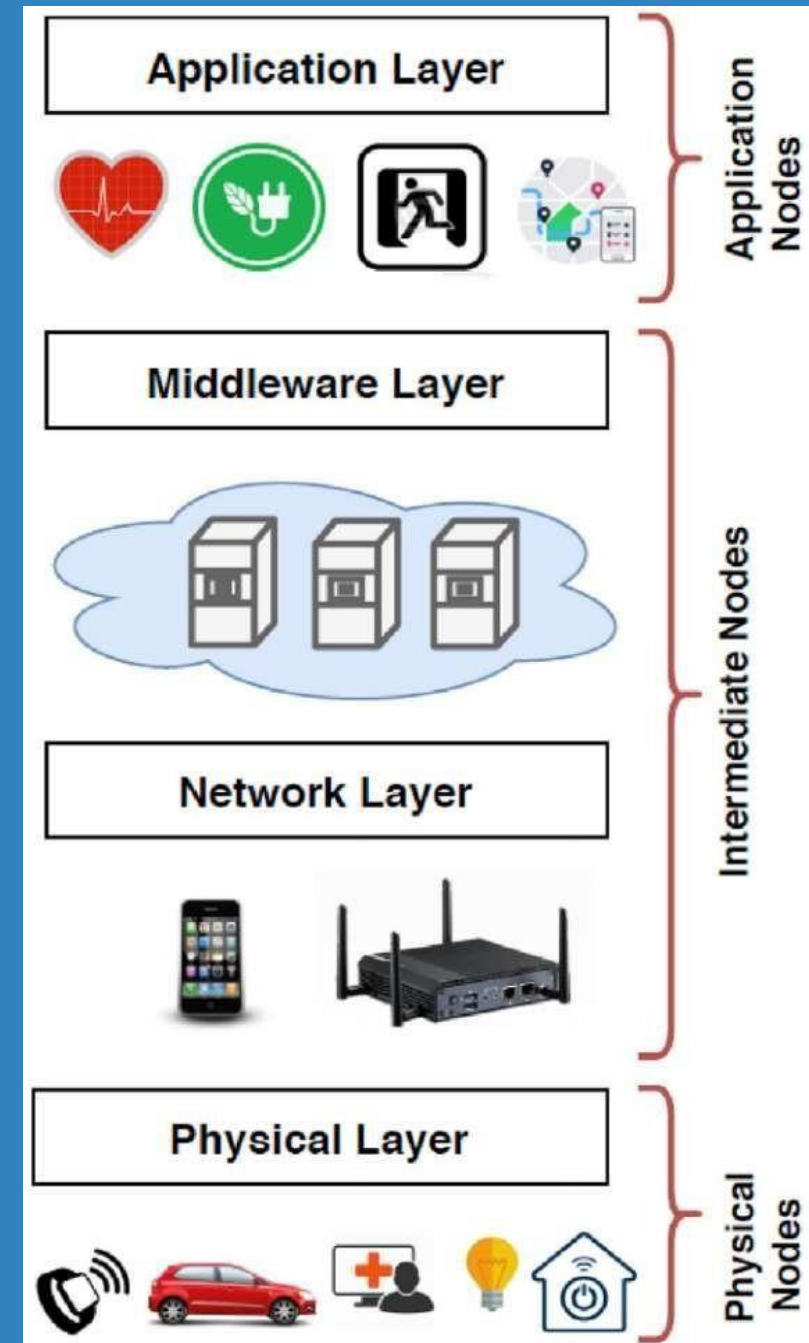
(Chahal, Kumar and Batra, 2020)



Arsitektur IoT

- **Application Layer**
 - ✓ Layanan ke user
 - ✓ Komunikasi dengan middleware
 - ✓ Antarmuka user akses layanan
- **Middleware Layer**
 - ✓ konektivitas dan interoperabilitas dalam ekosistem IoT.
- **Network Layer**
 - ✓ Mendukung jaringan dan transfer data antar simpul.
 - ✓ Protokol komunikasi yang diperlukan untuk pertukaran data dalam ekosistem IoT
- **Physical Layer**
 - ✓ Mengkarakterisasi kemampuan penginderaan dan kontrol dari sistem IoT
 - ✓ Berupa simpul fisik seperti sensor dan aktuator yang merasakan lingkungan dan berinteraksi dengannya dalam menanggapi perubahan atau permintaan user

(Ravidas *et al.*, 2019)



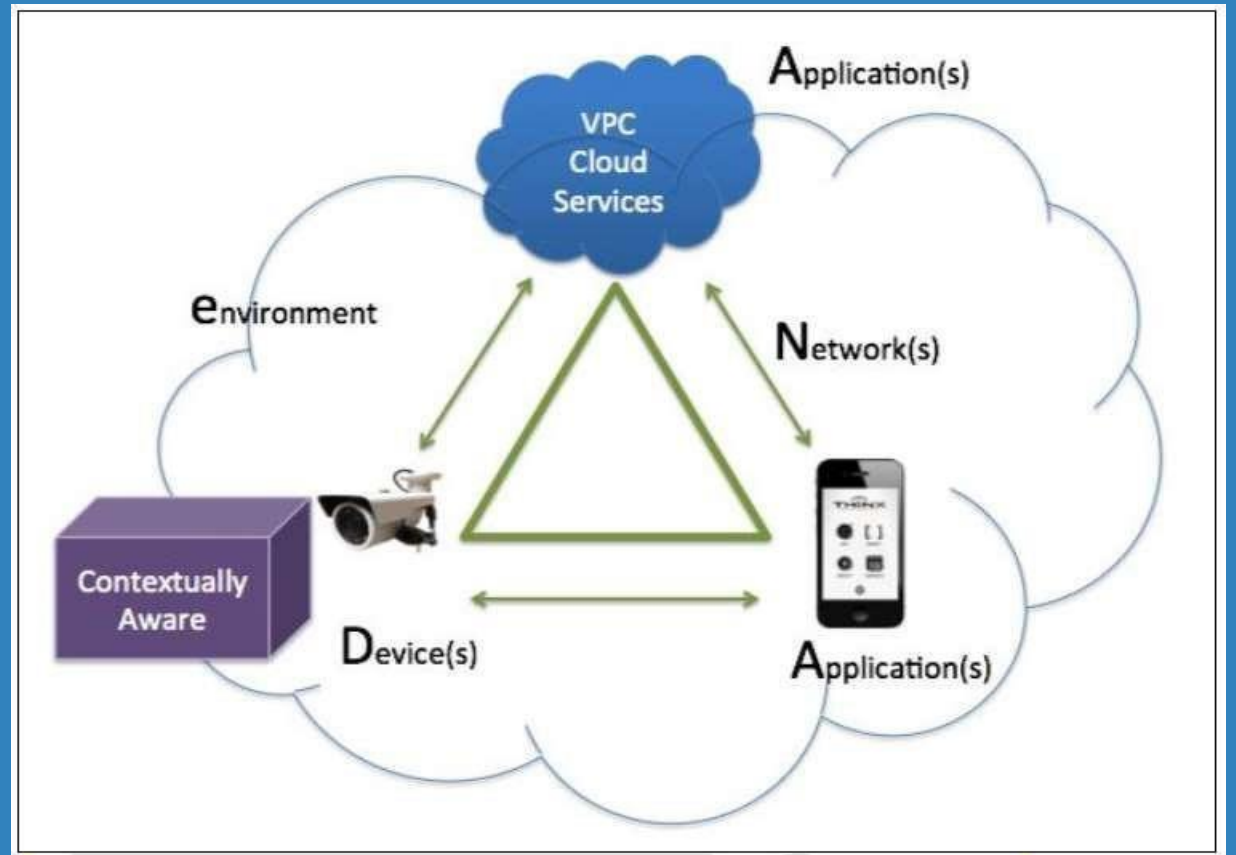
Beberapa Contoh Aplikasi IoT

- **Smart Home** (sistem keamanan rumah berbasis internet, dapat mengetahui keadaan rumah serta mengontrol peralatan rumah tangga melalui jaringan internet).
- **Smart Farming** (sistem pertanian cerdas berbasis internet, untuk pemantauan dan pengendalian kualitas air dan tanah pertanian serta pertumbuhan tanaman melalui jaringan internet).
- **Internet industry** (pemantauan dan pengendalian peralatan serta proses di industri)
- **Kesehatan** (pemantauan kondisi kesehatan seseorang).
- **Transportasi** (majemen dan informasi lalu lintas).

Sistem IoT

Sistem dasar dari IoT, yaitu:

1. Hardware/fisik (*Things*).
2. Koneksi internet.
3. *Cloud data center* sebagai tempat untuk menyimpan atau menjalankan aplikasinya.



Yang dibutuhkan

Application

Silahkan diinstall IoT MQTT Panel dari PlayStore di HP Android

Cloud IoT

Kami perkenalkan Cloud IoT Pendatang Baru di Indonesia (iot.net) → Cita-citanya menggantikan cloudmqtt.com / thingspeak.com

Device

Bisa digunakan IoT Starter Kit Produk Tokotronik atau Rakit Sendiri

IoT MQTT Panel



IoT MQTT Panel

Rahul Kundu Tools

★★★★★ 727

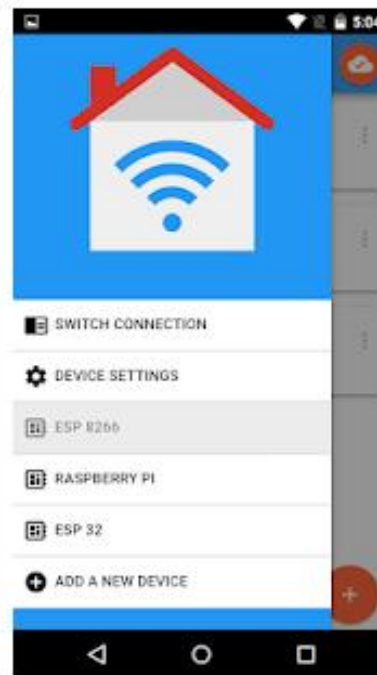
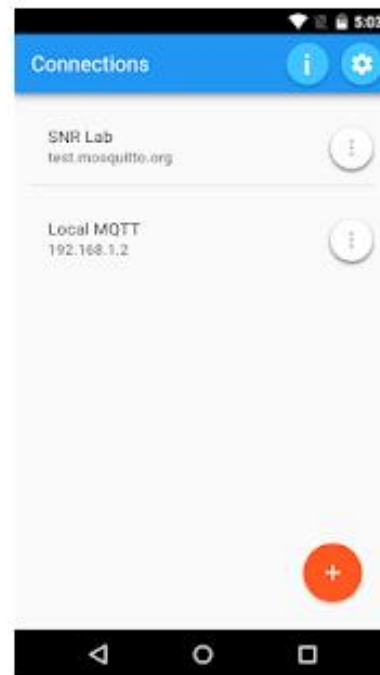
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Organization: Whois Privacy Service

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Phone: +1.2065771368

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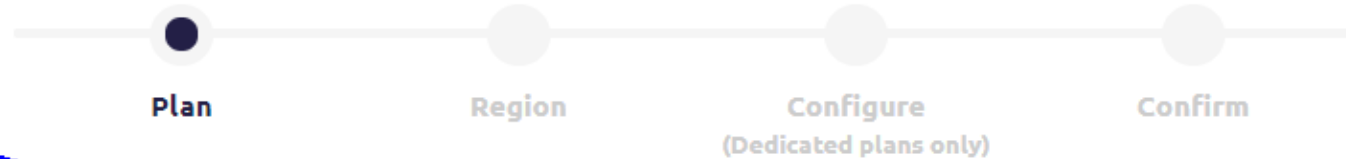
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- Use fewer keywords
- Use * to represent zero or more alphanumeric characters (e.g., *invert** matches "invert" and "inverter")
- Use [Advanced Search](#)
- Refer to our [Search Tips](#)

Layanan Gratis sudah tidak tersedia

Create new instance

No credit card Please [add a credit card](#) if you want to subscribe to a paid plan



Plan Cute Cat is no longer available.

Select a plan and name - Step 1 of 4

Name

Name to describe your instance

Plan

Tags

Shared

Cute Cat (Free)

Dedicated

Tags are used to separate your instances between projects. This is primarily used in the project listing view for easier navigation and access control.

Tags allow admins to [manage team members access](#) to different groups of instances.

Plan

See the [plan page](#) to learn about the different plans.

Plans & Pricing

Dedicated Instances

Your own broker on a dedicated server.



Power Pug

- Up to 10 000 connections
- No artificial limitations
- Support by e-mail
- Support by phone

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Loud Leopard

- Up to 1 000 connections
- No artificial limitations
- Support by e-mail

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Get Now



Keen Koala

- Up to 100 connections
- No artificial limitations
- Support by e-mail

\$ 19

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Get Now

Shared Instances

For development or small hobby projects. Not recommended for production due to variable performance.



Humble Hedgehog

- 25 users/acl rules/connections
- 20 Kbit/s
- 3 bridges
- Support by e-mail

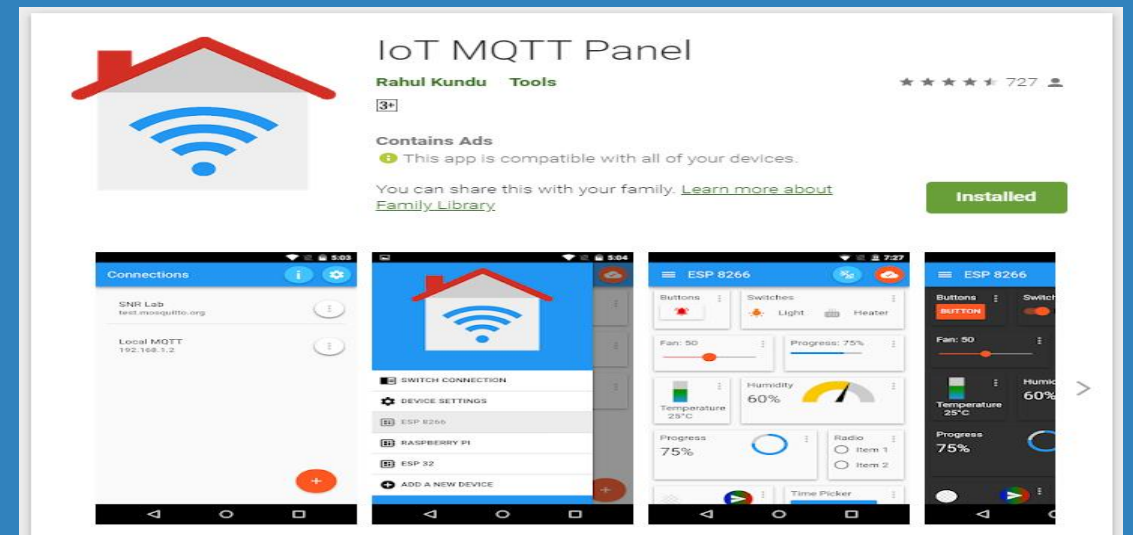
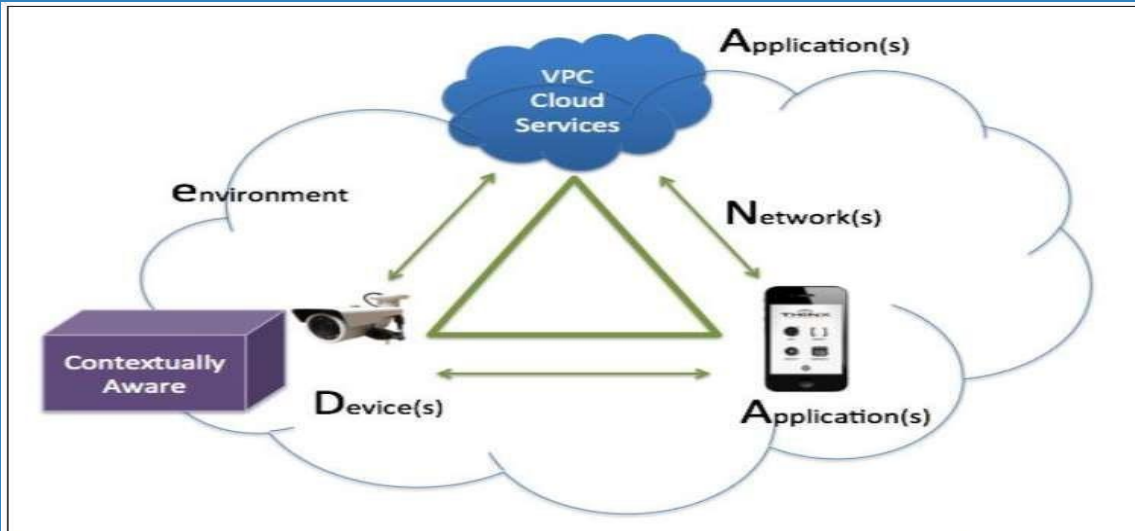
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Get Now



Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net



Setting Cloud IoT (i-ot.net) di IoT MQTT Panel

← Edit Connection

Connection name *
Monitoring Suhu

Client ID
monitorsuhu

Broker Web/IP address *
i-ot.net

Port number *
1883

Network protocol
TCP

Dashboard list

Monitoring Suhu

Additional options

CANCEL SAVE

Wide Range of Sensors OPEN

← Edit Connection

Dashboard list

Monitoring Suhu

Additional options

Connection timeout
30

Keep alive
60

Username
upnmqtt

Password
.....

Add will message

☐ Notify on disconnect

☐ Connect automatically

CANCEL SAVE

If you need to monitor or control sensors via the web our solution is what you need. OPEN

Isikan:
Port 1883
TCP

User:
upnmqtt
Password:
20upnmqtt

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net

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

```
String Topic;  
String Payload;
```

```
const char* ssid = "wifi"; // Tergantung wifi yang digunakan  
const char* password = "password"; // Password wifi
```

```
#define IN_1 D5 // Kipas  
int outputpin = A0; // sensor LM35  
int analogValue;  
float millivolts,celsius;
```


Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net

```
#define mqttServer "i-ot.net"  
#define mqttPort 1883  
#define mqttUser "upnmqtt"  
#define mqttPassword "20upnmqtt"
```

```
WiFiServer server(80);  
WiFiClient espClient;  
PubSubClient client(espClient);
```

```
void receivedCallback(char* topic, byte* payload, unsigned int length) {  
    Serial.print("Message received: ");  
    Serial.println(topic);  
    Serial.println();  
}
```

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net

```
void setup() {  
  Serial.begin(115200);  
  delay(10);  
  pinMode(IN_1, OUTPUT);  
  digitalWrite(IN_1, LOW);  
  
  // Connect to WiFi network  
  Serial.println();  
  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.println("WiFi connected");
```

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net

```
server.begin();  
Serial.println("Server started");  
  
Serial.print("Use this URL to connect: ");  
Serial.print("http://");  
Serial.print(WiFi.localIP());  
Serial.println("/");  
  
// Connect to Server IoT (CloudMQTT)  
  
client.setServer(mqttServer, mqttPort);  
client.setCallback(receivedCallback);
```

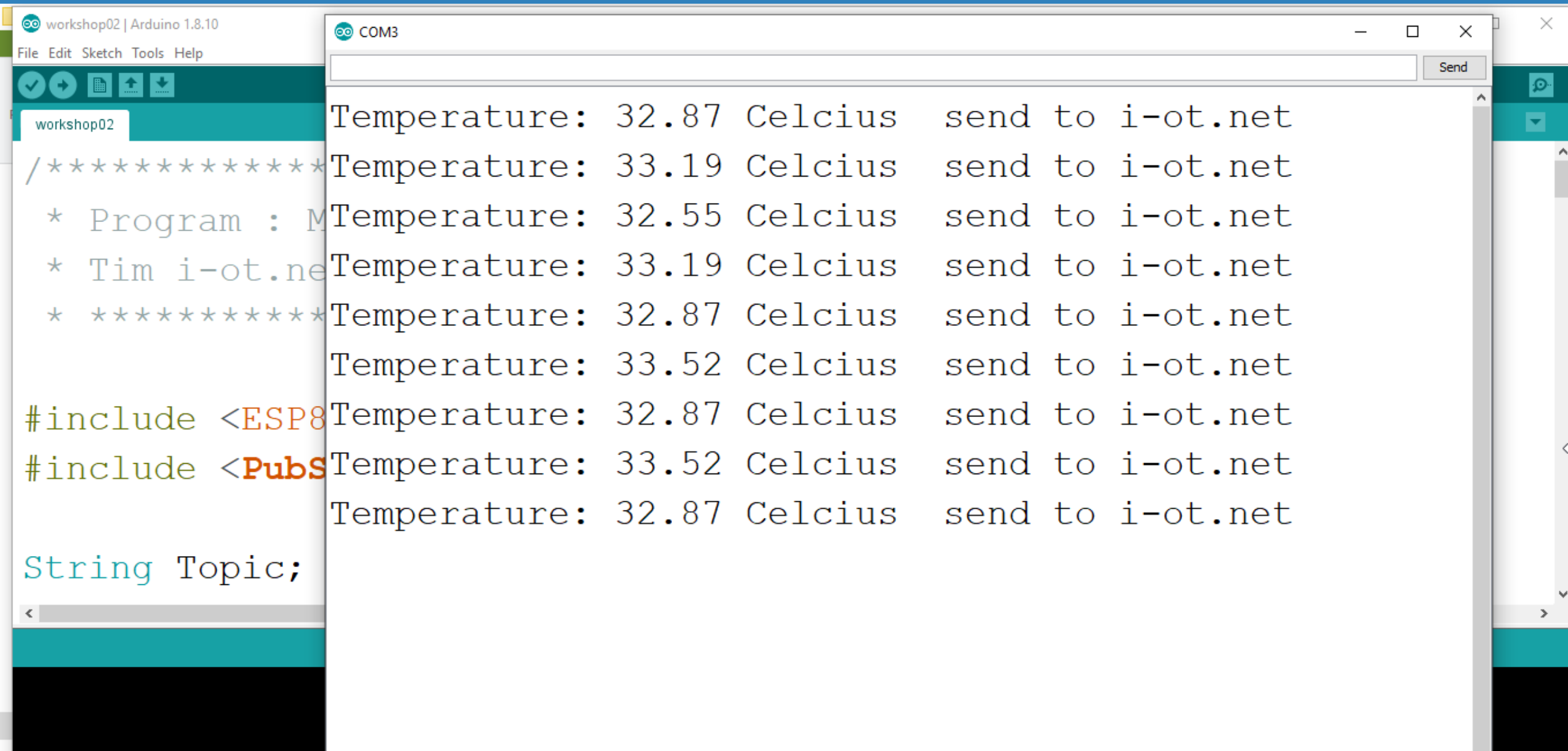
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```
while (!client.connected()) {  
    Serial.println("Connecting to CCloudMQTT...");  
  
    if (client.connect("ESP32Client", mqttUser, mqttPassword )) {  
  
        Serial.println("connected");  
  
    } else {  
        Serial.print("failed with state ");  
        Serial.print(client.state());  
        delay(2000);  
    }  
}
```

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net

```
void loop() {  
  
    char hasil[4];  
    // client.loop();  
  
    analogValue = analogRead(outputpin);  
    millivolts = (analogValue/1024.0) * 3300;  
    celsius = millivolts/10;  
  
    Serial.print("Temperature: ");  
    Serial.print(celsius);  
    Serial.print(" Celcius ");  
    Serial.println(" send to i-ot.net");  
  
    dtostrf(celsius, 1, 0, hasil);  
    client.publish("Suhu",hasil);  
    client.subscribe("Suhu");  
    delay (1000);  
}
```

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net



The image shows two overlapping windows from an Arduino IDE. The background window is titled 'workshop02 | Arduino 1.8.10' and displays a C++ sketch. The foreground window is titled 'COM3' and shows the serial output of the sketch. The sketch code includes comments in Indonesian, preprocessor directives for ESP8266 and PubSubClient, and a variable declaration for a String Topic. The serial monitor displays a repeating pattern of temperature readings in Celsius and the command 'send to i-ot.net'.

```
workshop02 | Arduino 1.8.10
File Edit Sketch Tools Help

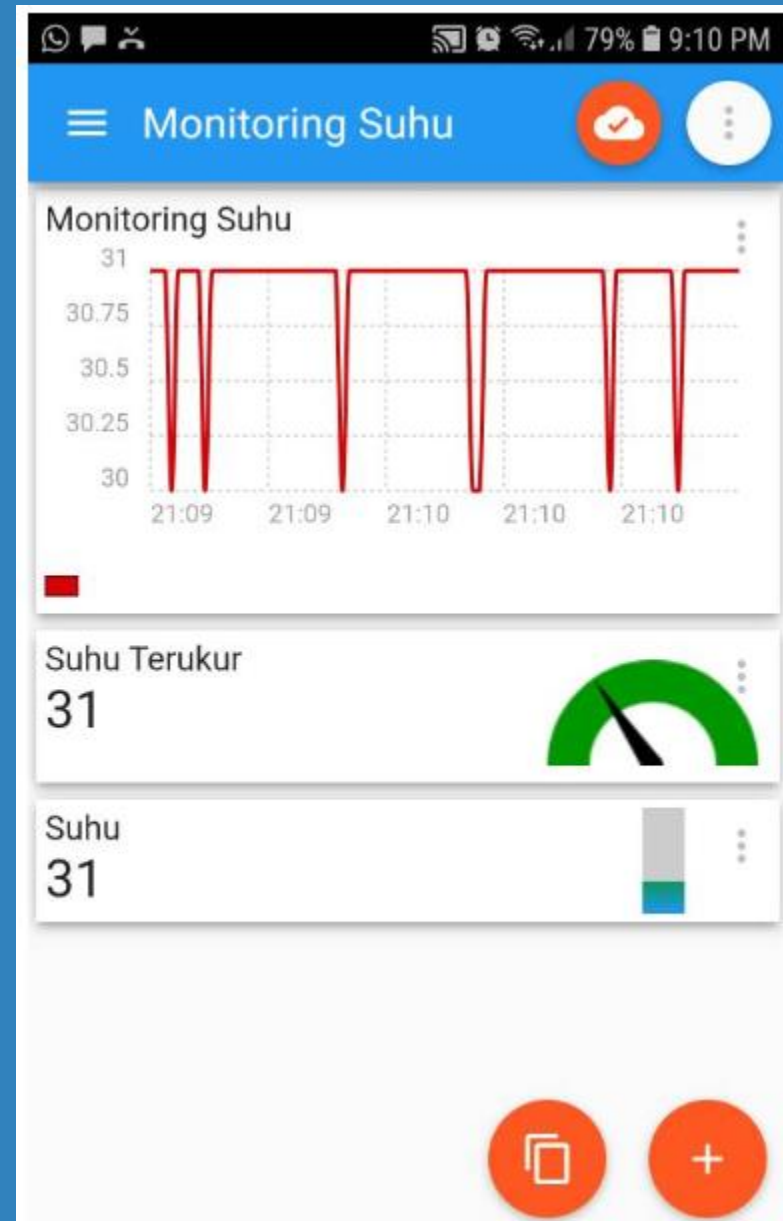
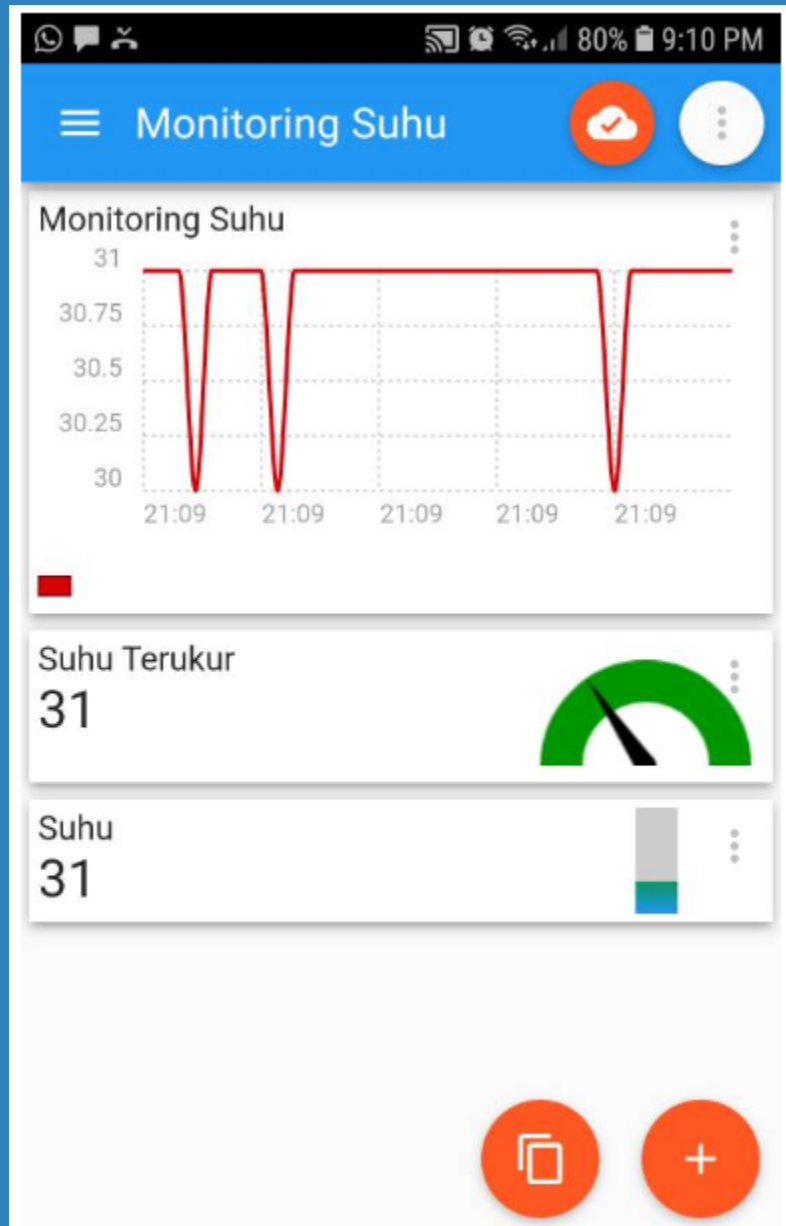
workshop02
/*****
 * Program : Monitoring Suhu Berbasis Cloud i-ot.net
 * Tim : i-ot.net
 * *****/

#include <ESP8266.h>
#include <PubSubClient.h>

String Topic;
```

```
COM3
Temperature: 32.87 Celcius send to i-ot.net
Temperature: 33.19 Celcius send to i-ot.net
Temperature: 32.55 Celcius send to i-ot.net
Temperature: 33.19 Celcius send to i-ot.net
Temperature: 32.87 Celcius send to i-ot.net
Temperature: 33.52 Celcius send to i-ot.net
Temperature: 32.87 Celcius send to i-ot.net
Temperature: 33.52 Celcius send to i-ot.net
Temperature: 32.87 Celcius send to i-ot.net
```

Eksperimen – Monitoring Suhu Berbasis Cloud i-ot.net



DEMO



Terima kasih