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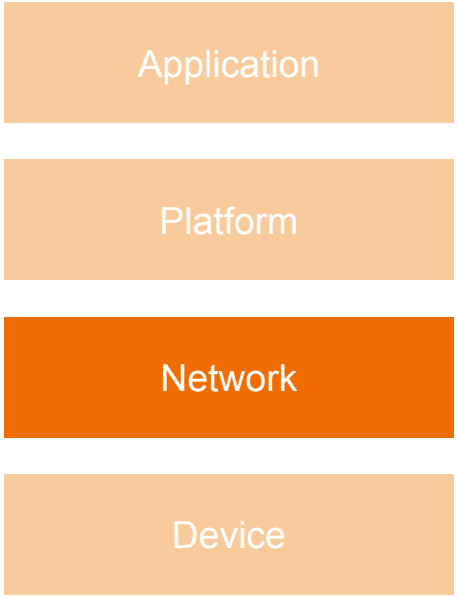
ANTARES

Intro to NB IoT & Project Development

Fariz Alemuda

IoT Stack



IoT Network

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Apa itu NB-IoT

NB IoT merupakan kependekan dari **Narrow Band-Internet of Things (NB-IoT)** adalah sebuah teknologi radio berbasis Low Power Wide Area (LPWA)

NB IoT diatur sesuai standard 3GPP Release 13 dan dirancang untuk kebutuhan di Internet of Things (IoT)

Ketahanan battery perangkat dapat bertahan hingga 10 tahun dan memiliki berbagai macam pengaplikasian

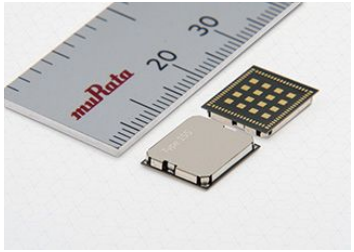
Teknologi ini dapat mendukung indoor maupun outdoor coverage, mendukung massive numbers of low throughput IoT devices, low delay sensitivity, ultra-low device cost, low device power consumption dan optimised network architecture.

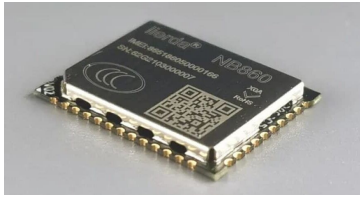
NB IoT Frequency

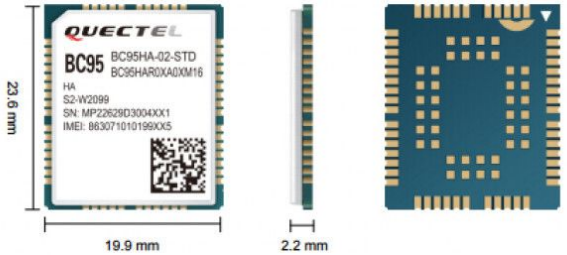
- Pita 1 - 2100 MHz
- Pita 3 - 1800 MHz
- Pita 5 - 800 MHz
- Pita 8 - 900 MHz
- Pita 31 - 450 MHz
- Pita 40 - 2300 MHz

NB IoT Identifier

NB IoT Chipset







NB IoT Development Board

Get NB IoT Connectivity

https://www.telkomsel.com/enterprise/umkm/iot/nb-iot

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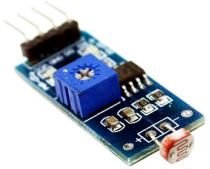
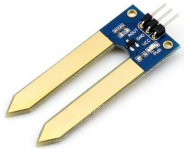
Project Development
Smart Farming

Smart Farming

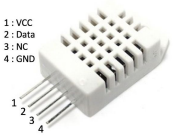
Sensor



ldr sensor

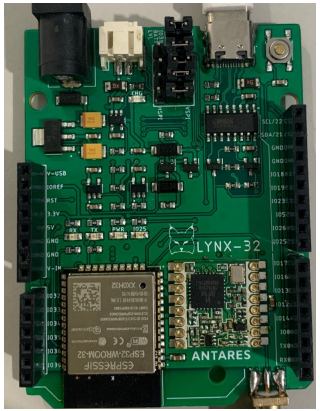


moisture sensor



environment sensor

Controller



Aktuator

controller

grow light

drip irrigation

blower fan

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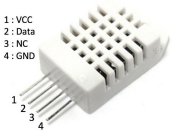
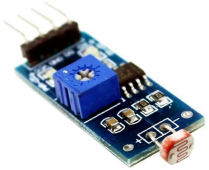
Parameter Otomasi



environment sensor

>27℃ → ON

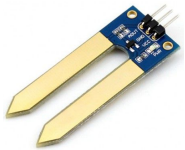
blower fan



ldr sensor

>2300 → ON

grow light



moisture sensor

>2800 → ON

drip irrigation

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Let’s do some hands-on

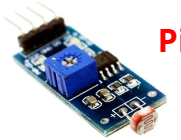
Sesi Hands-On

1. Konfigurasi dan Pemrograman Sensor
2. Konfigurasi dan Pemrograman Aktuator

Sesi Hands-On Sensor

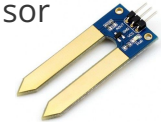
LDR Sensor	Membaca besaran tegangan dari jumlah cahaya yang masuk ke LDR
DHT22 Sensor	Pembacaan temperatur dan *humidity* menggunakan perintah dari sensor
Moisture Sensor	Membaca besaran tegangan yang diukur sensor dari kering/basahnya tanah
Akuisisi semua sensor dan kirim ke ANTARES	Pengiriman hasil pembacaan sensor secara *real time*

Akuisisi Sensor dan kirim ke ANTARES



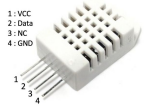
Pin IO36 = A0

ldr
sensor



Pin IO39 = A3

moisture sensor



Pin IO14 = 14

environment
sensor

POST

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Akuisisi Data Sensor dan Kirim ke ANTARES

1

```
#include <AntaresESP32HTTP.h>
#include "DHTesp.h"

#define ACCESSKEY "your-access-key"       // Ganti dengan access key akun
Antares anda
#define WIFISSID "your-wifi-ssid"         // Ganti dengan SSID WiFi anda
#define PASSWORD "your-wifi-pass"     // Ganti dengan password WiFi anda

#define applicationName "your-application-name"   // Ganti dengan
application name Antares yang telah dibuat
#define deviceName "your-device-name"     // Ganti dengan device Antares
yang telah dibuat

// deklarasi pin-pin sensor
#define PIN_DHT 14
#define PIN_LDR A0
#define PIN_MOISTURE A3

// inisialisasi object library
DHTesp dht;
AntaresESP32HTTP antares(ACCESSKEY);

// inisialisasi variable
int moisture = 0;
int ldr = 0;
int temp =0;
int hum = 0;
```

2

```
void setup()
{
  // inisiasi Serial comm dengan baud rate 9600
  Serial.begin(9600);

  // inisiasi pin sensor
  // inisiasi LDR
  pinMode(PIN_LDR, INPUT);
  // inisiasi Moisture
  pinMode(PIN_MOISTURE, INPUT);
  // inisiasi DHT
  dht.setup(PIN_DHT, DHTesp::DHT22);

  // inisiasi wifi antares
  antares.wifiConnection(WIFISSID,PASSWORD);
  // inisiasi debug lib antares
  antares.setDebug(true);
}
```

ITARES

Akuisisi Data Sensor dan Kirim ke ANTARES

3

```
void loop() {
  // LDR
  ldr = analogRead(PIN_LDR);
  // moisture
  moisture = analogRead(PIN_MOISTURE);
  // DHT
  TempAndHumidity data = dht.getTempAndHumidity();
  // ekstrak data temperature
  temp = data.temperature;
  // ekstrak data humidity
  hum = data.humidity;

  // display data ke serial monitor
  Serial.println("==================");
  Serial.print("LDR: ");
  Serial.println(ldr);
  Serial.print("Suhu: ");
  Serial.println(temp);
  Serial.print("Kelembaban: ");
  Serial.println(hum);
  Serial.print("Moisture: ");
  Serial.println(moisture);
  Serial.println("==================");

  // include data ke json
  antares.add("LDR", ldr);
  antares.add("Suhu", temp);
  antares.add("Kelembapan", hum);
  antares.add("Moisture", moisture);

  //Kirim data ke Antares
  antares.send(applicationName, deviceName);
  delay(20000);
}
```

Output Akuisisi Data Sensor

Time (WIB)	Resource Index (ri)	Data

2022-08-29 18:47:52	/antares-cse/cin-gGaTTOU3QKSN0aNy	{
		"LDR": 2428,
		"Suhu": 25,
		"Kelembapan": 72,
		"Moisture": 2779
		}

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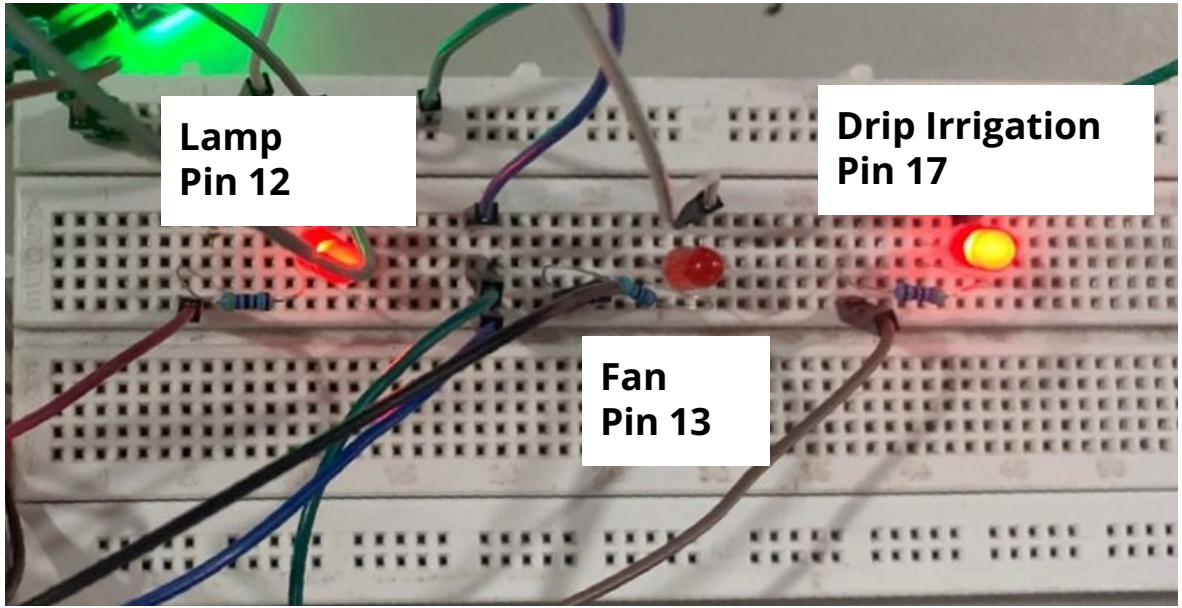
Akuator

Konfigurasi Pin



Aktuator

1

```
#include <AntaresESP32HTTP.h>

#define ACCESSKEY "your-access-key"       // Ganti dengan access key akun
Antares anda
#define WIFISSID "your-wifi-ssid"         // Ganti dengan SSID WiFi anda
#define PASSWORD "your-wifi-pass"     // Ganti dengan password WiFi anda

#define applicationName "your-application-name"   // Ganti dengan
application name Antares yang telah dibuat
#define deviceName "your-device-name"     // Ganti dengan device Antares
yang telah dibuat

// LED
#define LEDav 12 // ADC Value
#define LEDt 13 // Suhu
#define LEDmoist 17 // Moisture

// Batas LED Menyala
int batasLDR = 2400; // Batas ADC Value
int batast = 24; // Batas suhu
int batasmoist = 2800; // Batas Moisture

AntaresESP32HTTP antares(ACCESSKEY);      // Buat objek antares
```

```
void setup() {
  Serial.begin(9600);     // Buka komunikasi serial dengan baudrate 115200

  pinMode(LEDav, OUTPUT);
  pinMode(LEDt, OUTPUT);
  pinMode(LEDmoist, OUTPUT);

  antares.setDebug(true);   // Nyalakan debug. Set menjadi "false" jika
tidak ingin pesan-pesan tampil di serial monitor
  antares.wifiConnection(WIFISSID,PASSWORD);  // Mencoba untuk menyambungkan
ke WiFi
}
```

ANTARES

Aktuator

3

```
void loop() {
  // Mengambil data terakhir ke penampungan data
  antares.get(applicationName, deviceName);

  // Mendapatkan data individu
  int LDR = antares.getInt("LDR");
  int suhu = antares.getInt("Suhu");
  int kelembapan = antares.getInt("Kelembapan");
  int moist = antares.getInt("Moisture");

  // Print data ke serial monitor
  Serial.println("ADC Value: " + String(LDR));
  Serial.println("Suhu: " + String(suhu));
  Serial.println("Kelembapan: " + String(kelembapan));
  Serial.println("Moisture: " + String(moist));
  delay(10000);
```

4

```
  // LED LDR
  if(LDR > batasLDR){
    digitalWrite(LEDav, HIGH);
    Serial.println("Lamp is activated");
  }
  else {
    digitalWrite(LEDav, LOW);
    Serial.println("Lamp is deactivated");
  }

  // LED Suhu
  if(suhu > batast){
    digitalWrite(LEDt, HIGH);
    Serial.println("Fan is activated");
  }
  else {
    digitalWrite(LEDt, LOW);
    Serial.println("Fan is deactivated");
  }
  // LED Moisture
  if(moist > batasmoist){
    digitalWrite(LEDmoist, HIGH);
    Serial.println("Drip irigation is activated");
  }
  else {
    digitalWrite(LEDmoist, LOW);
    Serial.println("Drip irigation is deactivated");
  }

}
```

Hasil Pembacaan

Time (WIB)	Resource Index (ri)	Data
2022-08-29 18:47:52	/antares-cse/cin-gGaTTOU3QKSN0aNy	{ "LDR": 2428, "Suhu": 25, "Kelembapan": 72, "Moisture": 2779 }

```
Requesting URL: /~/antares-cse/antares-id/workshop-widyaedu/SmartFarm/la
{
  "LDR": 2428,
  "Suhu": 25,
  "Kelembapan": 72,
  "Moisture": 2779
}
[ANTARES] Closing connection...
ADC Value: 2428
Suhu: 25
Kelembapan: 72
Moisture: 2779
```

Action Aktuator dicerminkan via LED

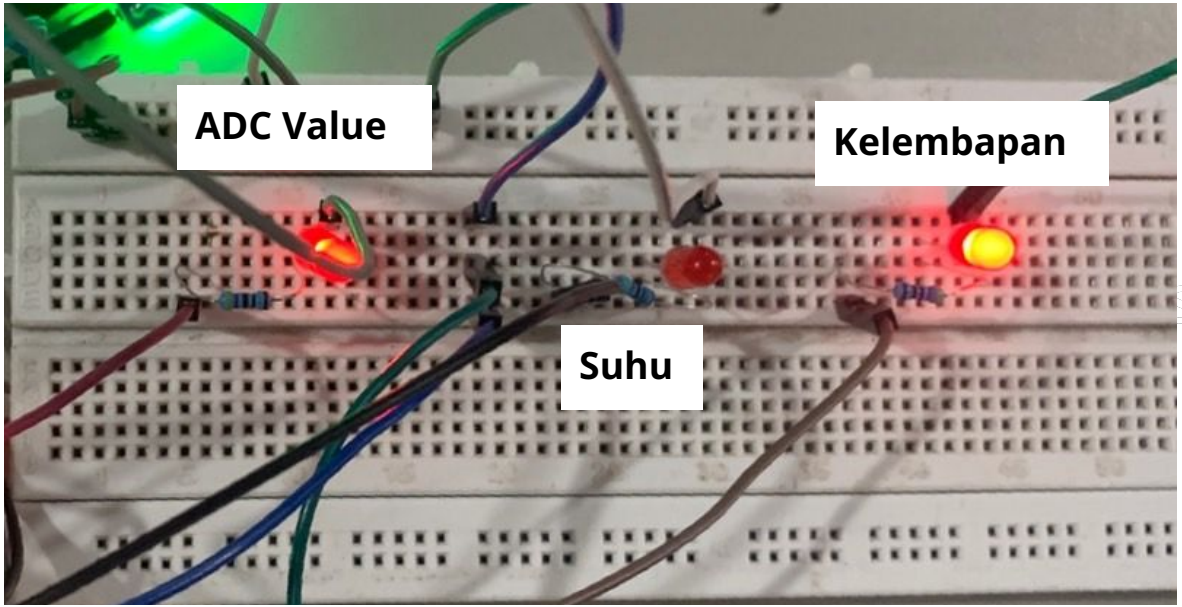
```
[ANTARES] Connecting to platform.antares.id
Requesting URL: /~/antares-cse/antares-id/AntaresHTTP/HTTP/la
{
  "ADC Value": 2357,
  "Suhu": 26,
  "Kelembapan": 66,
  "Moisture": 2906
}
[ANTARES] Closing connection...
ADC Value: 2357
Suhu: 26
Kelembapan: 66
Moisture: 2906
```

LED akan menyala apabila

Analog Value > 2300

Suhu > 27

Moisture > 2800



TERIMA KASIH

wish u luck!