

Lokakarya Internet of Things

Membuat Server Internet of Things

Di dukung oleh:





Tentang Saya

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Pembahasan



- Trend Revolusi industri 4.0
- Potensi Aplikasi IoT
- Contoh penggunaan teknologi IoT
- Komponen IoT
- Instalasi Server IoT
- Praktik dengan ESP8266

Trend Revolusi Industri 4.0



- **Revolusi industri 4.0** memiliki ciri adanya **transformasi digital** yang merubah cara organisasi beroperasi dan bekerja.
- **Transformasi digital** ini didukung teknologi:
 - **Cloud Computing,**
 - **Artificial Intelligence (AI),**
 - **Internet of Things,**
 - **Machine Learning.**

Definisi Internet of Things

infrastruktur global untuk masyarakat, serta memungkinkan layanan lanjutan yang interkoneksi dan terus berkembang.



Potensi digitalisasi di berbagai sektor di Indonesia

Across key sectors, Indonesia could harness digitization to realize total productivity impact of USD 120 billion by 2025.

USD billion

Sector	Estimated 2025 GDP base impact	Operation optimization	Human health and productivity	Product and sales development
Manufacturing	34.4	29.4	3.0	2.0
Retail	24.5	12.5	6.7	5.3
Transport	15.5	13.6	1.9	0.0
Mining	14.8	14.0	0.5	0.3
Agriculture	11.0	10.6	0.3	0.0
Telecom and media	7.9	5.7	1.7	0.5
Healthcare	6.6	2.2	4.3	0.0
Public sector and utilities	4.8	4.7	0.1	0.0
Financial	1.8	1.1	0.1	0.6
Total	121.4	93.8	18.7	8.9

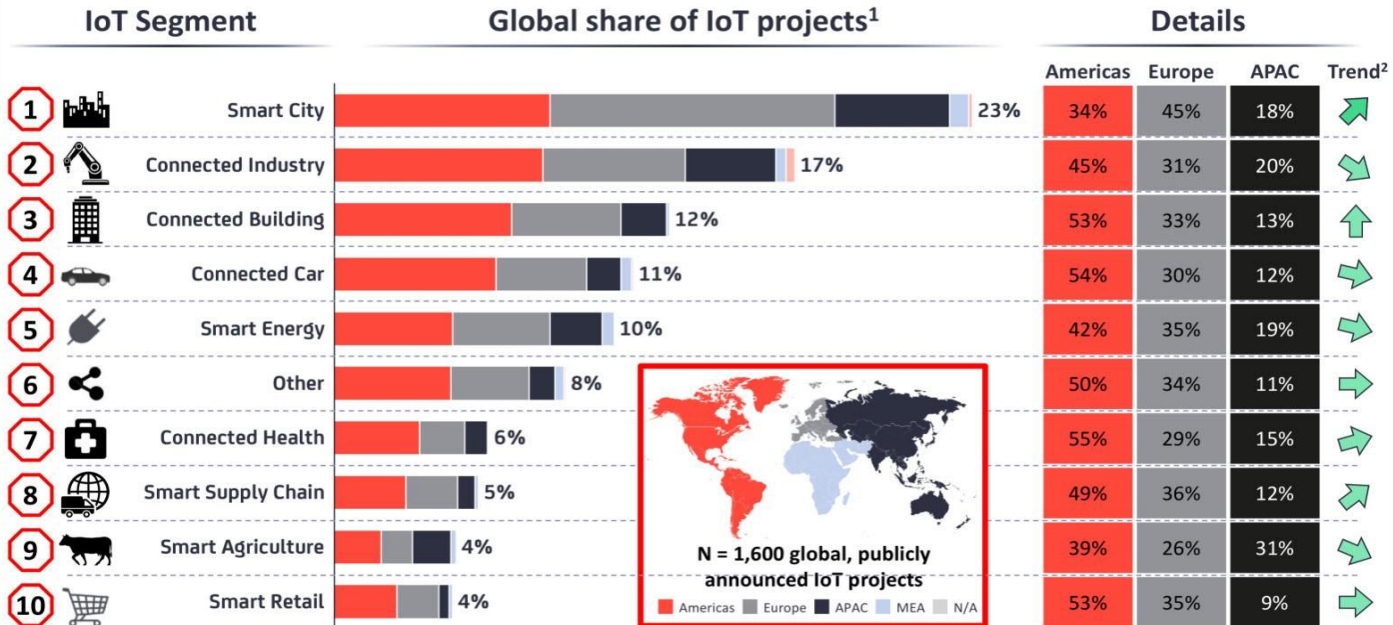
- Manufaktur
- Ritel
- Transportasi
- Tambang
- Pertanian
- Media dan Telekomunikasi
- Kesehatan
- Pelayanan Umum
- finansial

Peringkat Segmentasi IoT

IOT ANALYTICS

2018

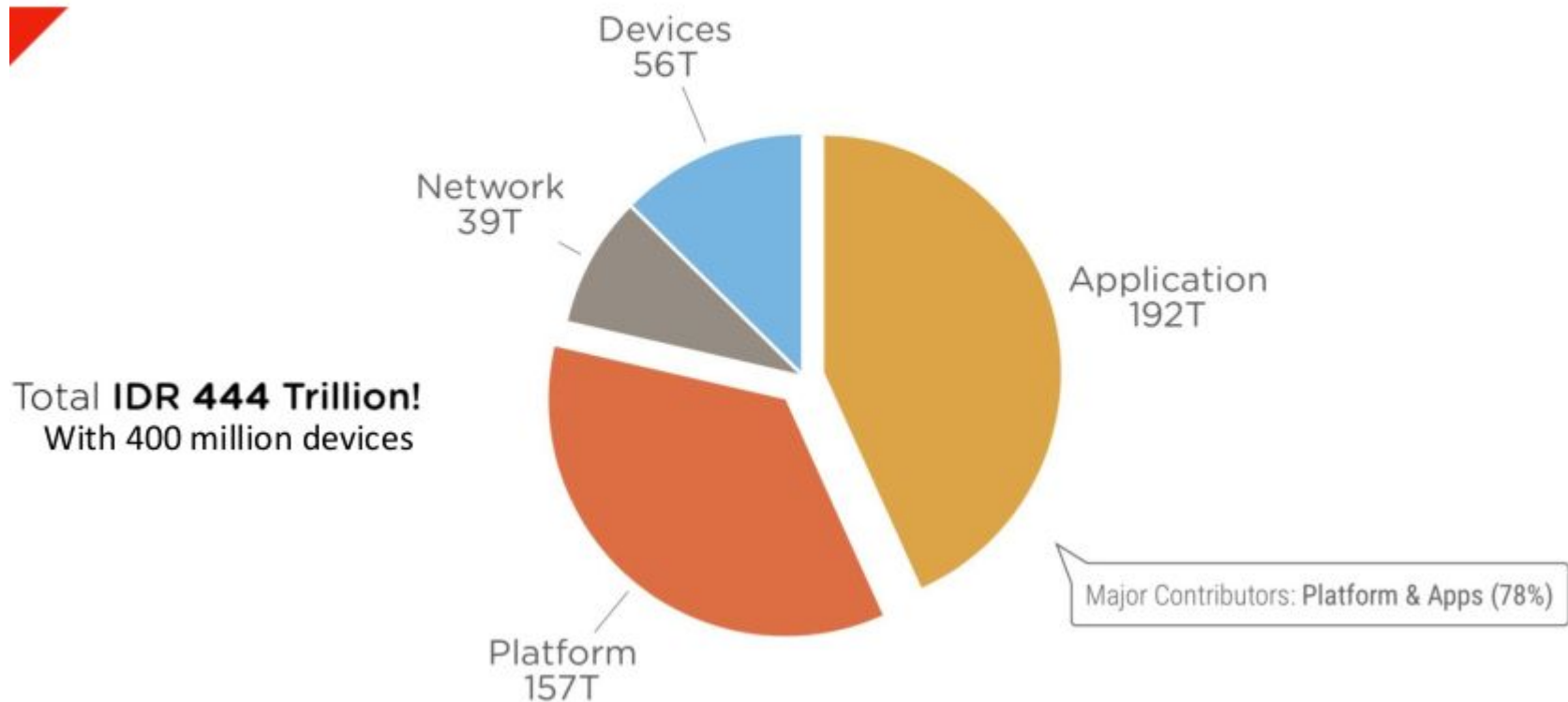
Insights that empower you to understand IoT markets



1. Based on 1,600 publicly known enterprise IoT projects (Not including consumer IoT projects e.g., Wearables, Smart Home). 2. Trend based on comparison with % of projects in the 2016 IoT Analytics Enterprise IoT Projects List. A downward arrow means the relative share of all projects has declined, not the overall number of projects 3. Not including Consumer Smart Home Solutions. **Source:** IoT Analytics 2018 Global overview of 1,600 enterprise IoT use cases (Jan 2018)

Source: IoT Analytics, Jan 2018

Indonesia's IoT Market in 2022



Komponen Penyusun IoT

Concept of IoT



Things:

Perangkat komputasi kecil untuk penginderaan dan aksi.

Cloud:

Server untuk komputasi dan penyimpanan

Intelligence:

Algoritma analisis data dan pengambilan keputusan dari data

Contoh IoT - Smart Home

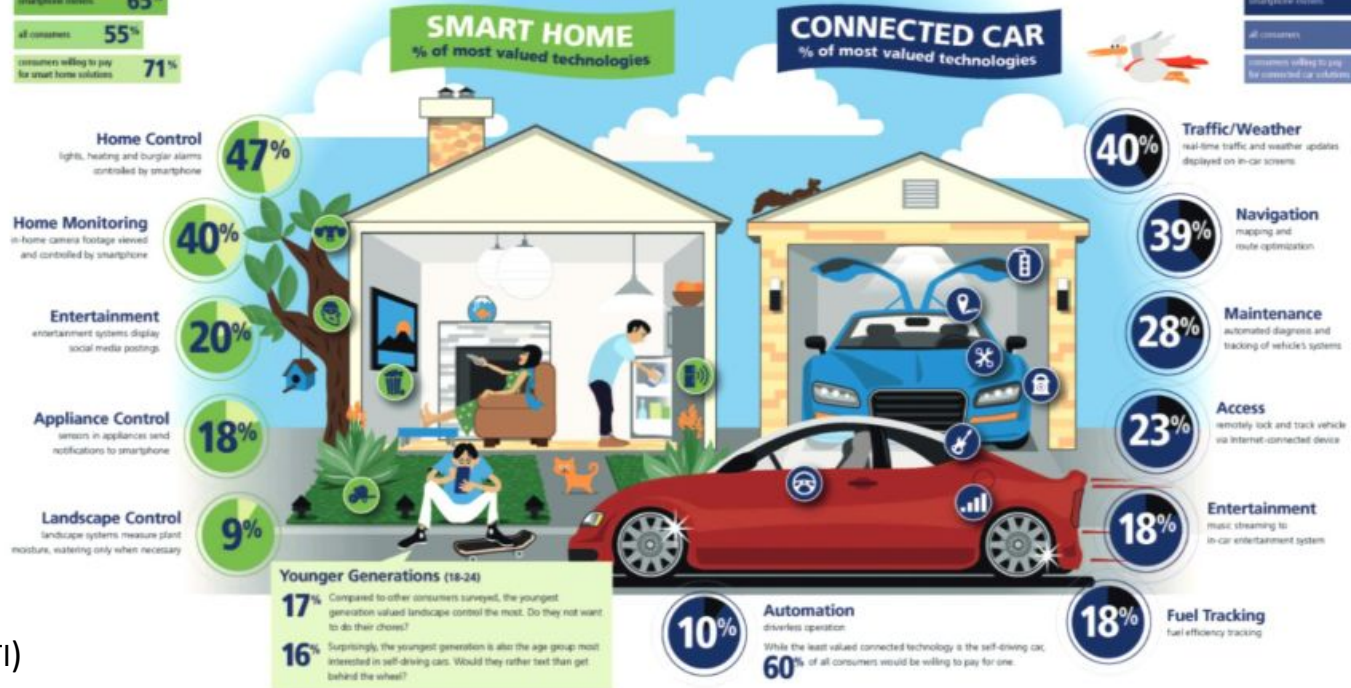
The Internet of Things Moves In

The 2014 U.S. edition of Deloitte's Global Mobile Consumer Survey reveals that smartphone owners overindexed in their desire for Internet of Things (IoT) solutions for the home and car.

Would find value in smart HOME solutions



Would find value in connected CAR solutions





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Instalasi Server

Node-RED

Node-RED

[home](#)

[about](#)

[blog](#)

[documentation](#)

[forum](#)

[flows](#)

[github](#)

Node-RED

Flow-based programming for the Internet of Things

Latest version: v0.20.8 (npm)

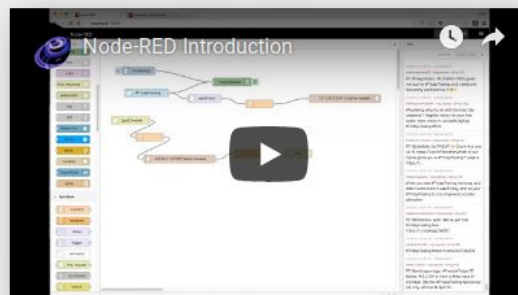
Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its runtime in a single-click.

[Features](#)

[Get Started](#)

[Community](#)



Instalasi Node-RED

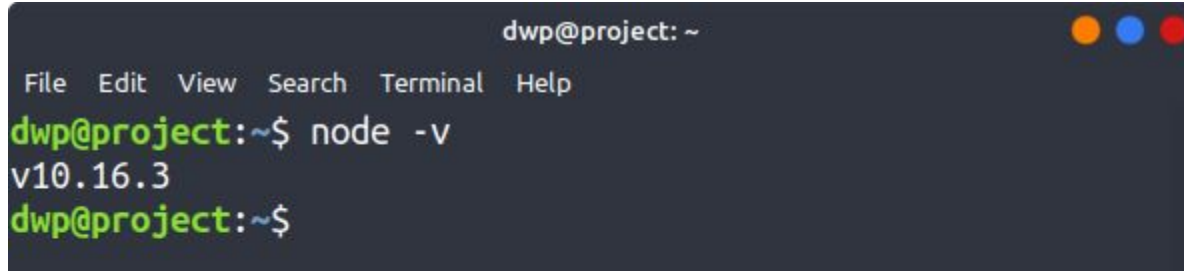


- **Install Node.js**
- **Install npm**
- **Install Node-RED - Ubuntu**
- **Install Node-RED - Docker**

Instalasi Node-RED



- **Install Node.js**
 - `curl -sL https://deb.nodesource.com/setup_10.x | sudo -E bash -`
 - `sudo apt-get install nodejs`
 - `node -v`

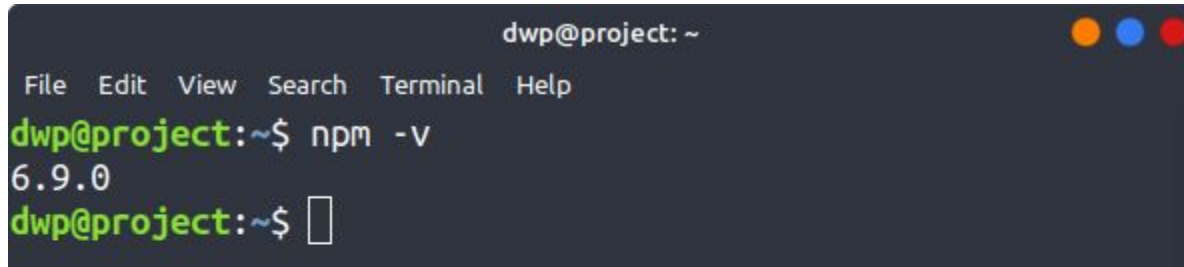


```
dwp@project: ~  
File Edit View Search Terminal Help  
dwp@project:~$ node -v  
v10.16.3  
dwp@project:~$
```


Instalasi Node-RED



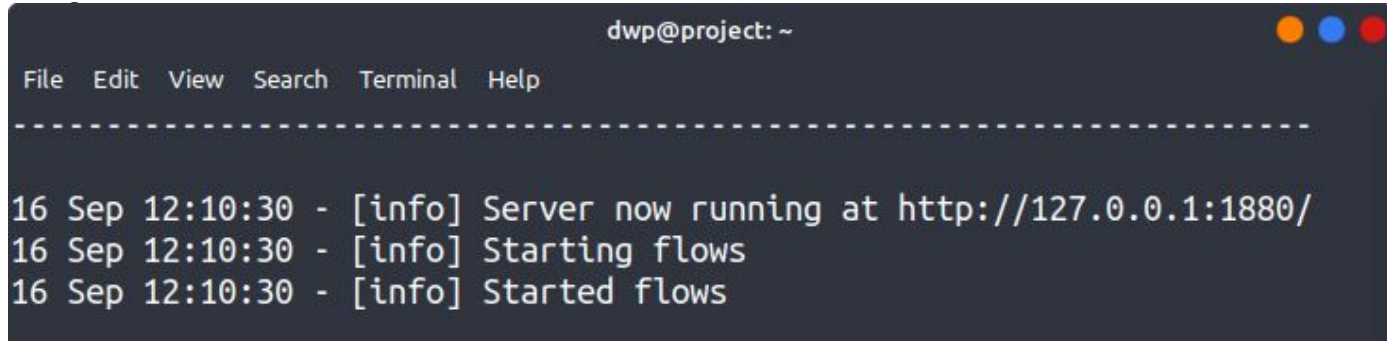
- Install npm
 - `sudo apt-get install npm`
 - `npm -v`



```
dwp@project: ~  
File Edit View Search Terminal Help  
dwp@project:~$ npm -v  
6.9.0  
dwp@project:~$
```

Instalasi Node-RED

- **Install Node-RED - Ubuntu**
 - `sudo npm install -g --unsafe-perm node-red`
- **Menjalankan Node-RED**
 - `node-red`



A terminal window with a dark background and light text. The title bar shows 'dwp@project: ~' and three window control buttons (orange, blue, red). The menu bar includes 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. A dashed line separates the menu from the output. The output shows three log messages: '16 Sep 12:10:30 - [info] Server now running at http://127.0.0.1:1880/', '16 Sep 12:10:30 - [info] Starting flows', and '16 Sep 12:10:30 - [info] Started flows'.

```
dwp@project: ~
File Edit View Search Terminal Help
-----
16 Sep 12:10:30 - [info] Server now running at http://127.0.0.1:1880/
16 Sep 12:10:30 - [info] Starting flows
16 Sep 12:10:30 - [info] Started flows
```

Instalasi Node-RED

The screenshot displays the Node-RED web interface. The top header bar is black with the Node-RED logo and name on the left, and a 'Deploy' button and a menu icon on the right. Below the header, there's a search bar labeled 'filter nodes' and two tabs for 'Flow 1' and 'Flow 2'. The main workspace is a large grid. On the left, there are two panels: 'input' and 'output'. The 'input' panel contains nodes like inject, catch, status, link, mqtt, http, websocket, tcp, and udp. The 'output' panel contains a debug node. On the right, there's a sidebar with the 'info' tab selected. The 'info' tab shows the 'Information' section with details about the current flow (Flow 2) and a 'Description' section. At the bottom of the sidebar, there's a tip about using keyboard shortcuts to toggle between the 'info' and 'debug' tabs.

Node-RED

Deploy

filter nodes

Flow 1 Flow 2

input

- inject
- catch
- status
- link
- mqtt
- http
- websocket
- tcp
- udp

output

- debug

info

Information

Flow	"b1e95b5c.cfcbb"
Name	Flow 2
Status	Enabled

Description

Show the Info tab with `ctrl-g` i or
the Debug tab with `ctrl-g` d

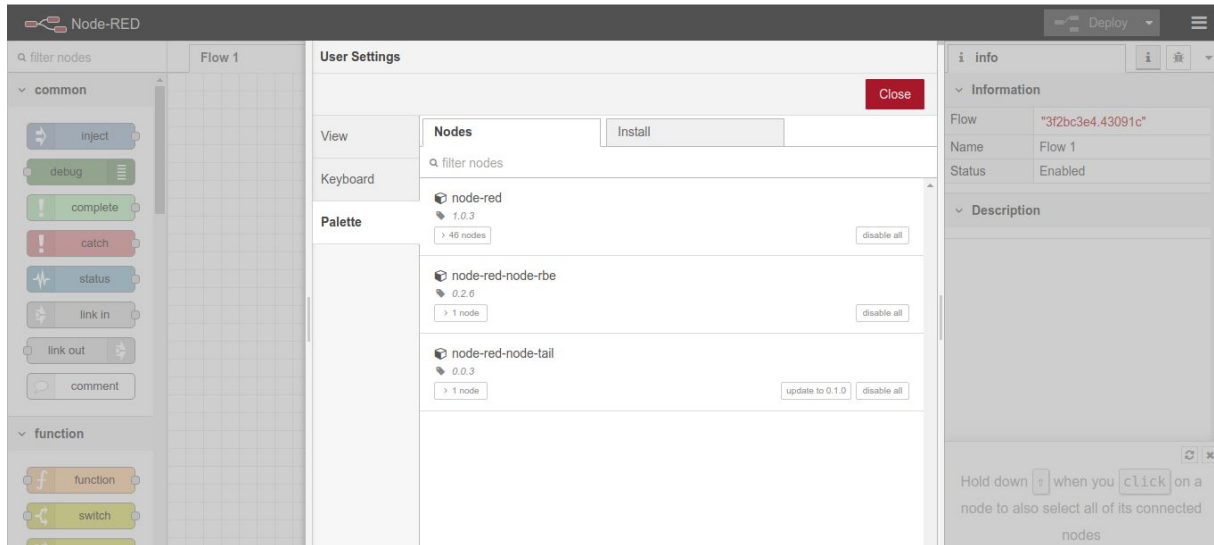
Instalasi Node-RED



- **Install Node-RED - Docker**
 - `docker run -it -p 1880:1880 --name iot-klas davidwah/node-red-dwp`

Instalasi Node-RED

- Install paket dashboard
 - node-red-dashboard
 - `$ npm install node-red-dashboard`

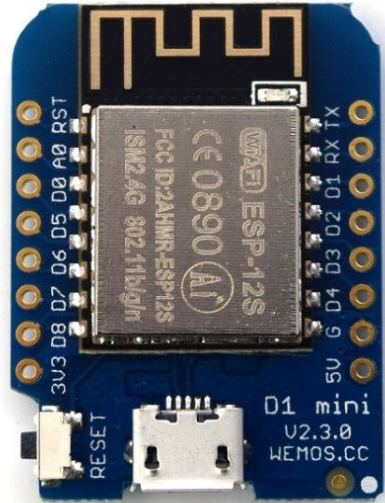
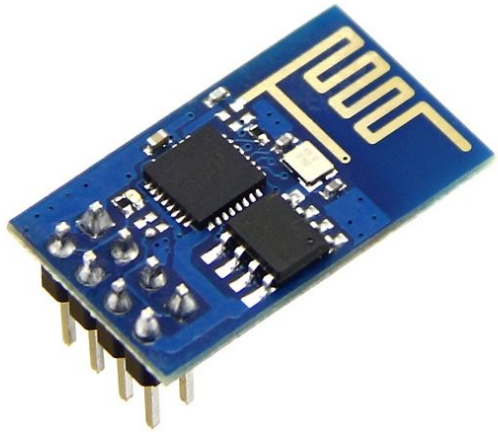


Praktik dengan Mikrokontrol





Mikrokontrol ESP



Praktik dengan ESP8266



Komponen yang perlu disiapkan:

- Software Arduino IDE
- Library :
 - esp8266
 - PubSubClient

Praktik dengan ESP8266



Menambahkan paket **Board Manager ESP8266**

File -> Preferences -> Additional Board Manager URLs

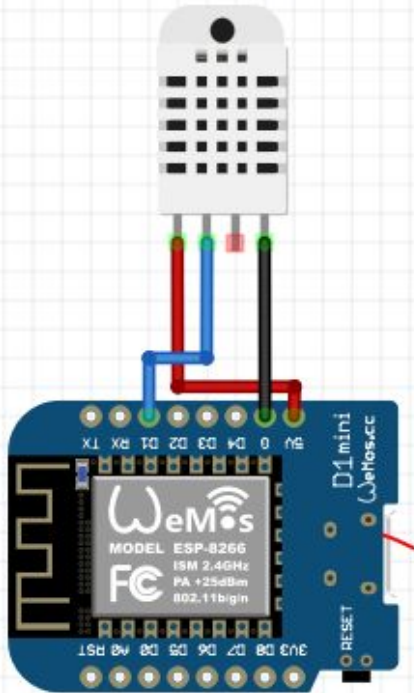
`http://arduino.esp8266.com/stable/package_esp8266com_index.json`

Menambahkan paket **PubSubClient**

Sketch -> Include Library -> Manage Libraries

Ketik pada kolom pencarian `PubSubClient` (Nick O'Leary)

Praktik dengan ESP8266 dan DHT11



NodeMCU => DHT 11

- Pin VCC DHT11 ke Pin 5V
- Pin GND DHT11 ke Pin G (Ground)
- Pin Data DHT 11 ke Pin D1(Digital 1)

Kode program:

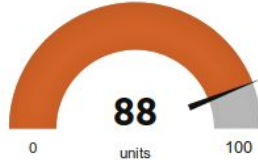
[Wemos DHT11 MQTT](#)

Praktik dengan ESP8266 dan DHT11

≡ Home

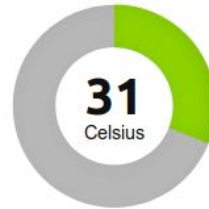
Default

Humidity



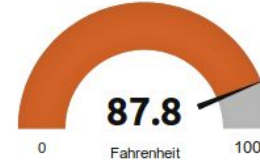
Group 2

Celsius



Group 3

Fahrenheit



Praktik dengan ESP8266 dan DHT11

The screenshot displays the Node-RED web interface. On the left, the 'input' palette contains various nodes like inject, catch, status, link, mqtt, http, websocket, tcp, and udp. The main workspace features a flow for a DHT11 sensor. It includes three 'sensor' nodes: 'sensor/humidity', 'sensor/temp_celsius', and 'sensor/temp_fahrenheit', each marked as 'connected'. These are connected to three output nodes: 'Humidity', 'Celsius', and 'Fahrenheit'. All three output nodes are also connected to a 'chart' node. The right sidebar shows the 'info' panel for the selected 'chart' node, displaying its ID 'a921e1d0.c11768' and type 'ui_chart'. The 'Description' section explains that the chart plots input values and can be configured as a line, bar, or pie chart. The 'Node Help' section provides details on how the `msg.payload` is converted to a number.

Node-RED

filter nodes

DHT11

input

- inject
- catch
- status
- link
- mqtt
- http
- websocket
- tcp
- udp

sensor/humidity (connected)

sensor/temp_celsius (connected)

sensor/temp_fahrenheit (connected)

Humidity

Celsius

Fahrenheit

chart

info

Information

Node	"a921e1d0.c11768"
Type	ui_chart

show more

Description

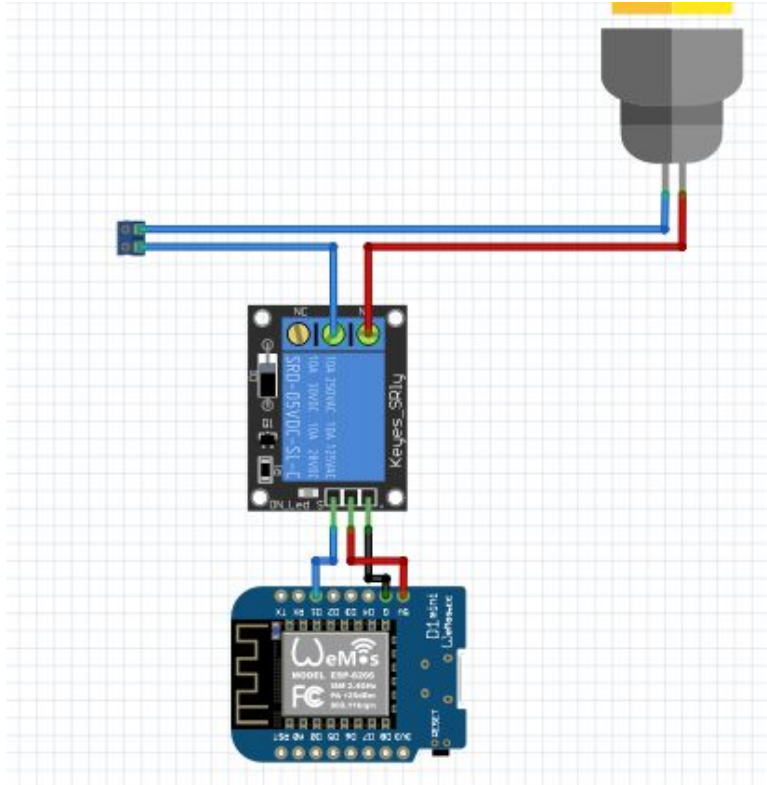
Node Help

Plots the input values on a chart. This can either be a time based line chart, a bar chart (vertical or horizontal), or a pie chart.

Each input `msg.payload` value will be converted to a number. If the conversion fails, the message is ignored.

You can confirm your changes in the

Praktik dengan ESP8266 dan Relay



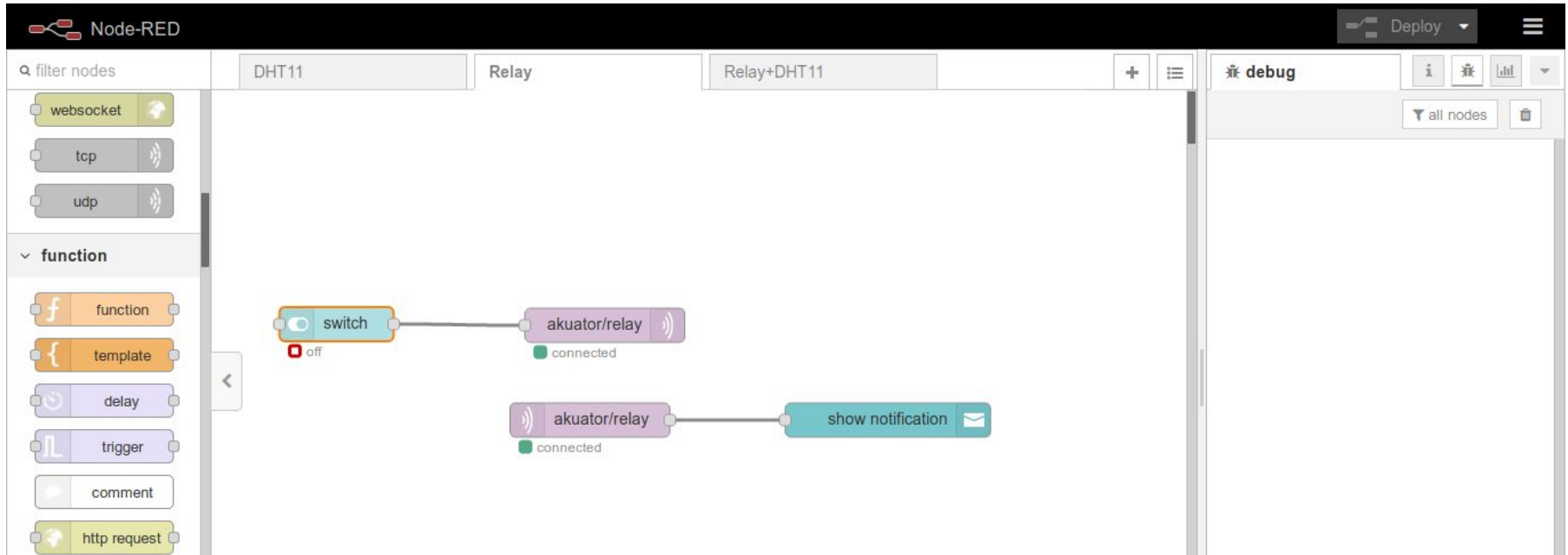
NodeMCU => Relay

- Pin VCC relay ke 5V
- Pin GND Relay ke Pin G (Ground)
- Pin Data Relay ke pin D1 (Digital 1)

Kode program:

[Wemos Relay MQTT](#)

Praktik dengan ESP8266 dan Relay



A small horizontal bar with a teal segment on the left and an orange segment on the right.A large teal octagonal sign with a white border and the word "Finish" in white text.

Finish

Three small green 3D hexagonal blocks arranged around the base of the "Finish" sign: one to the left, one in front, and one to the right.

Thank You