

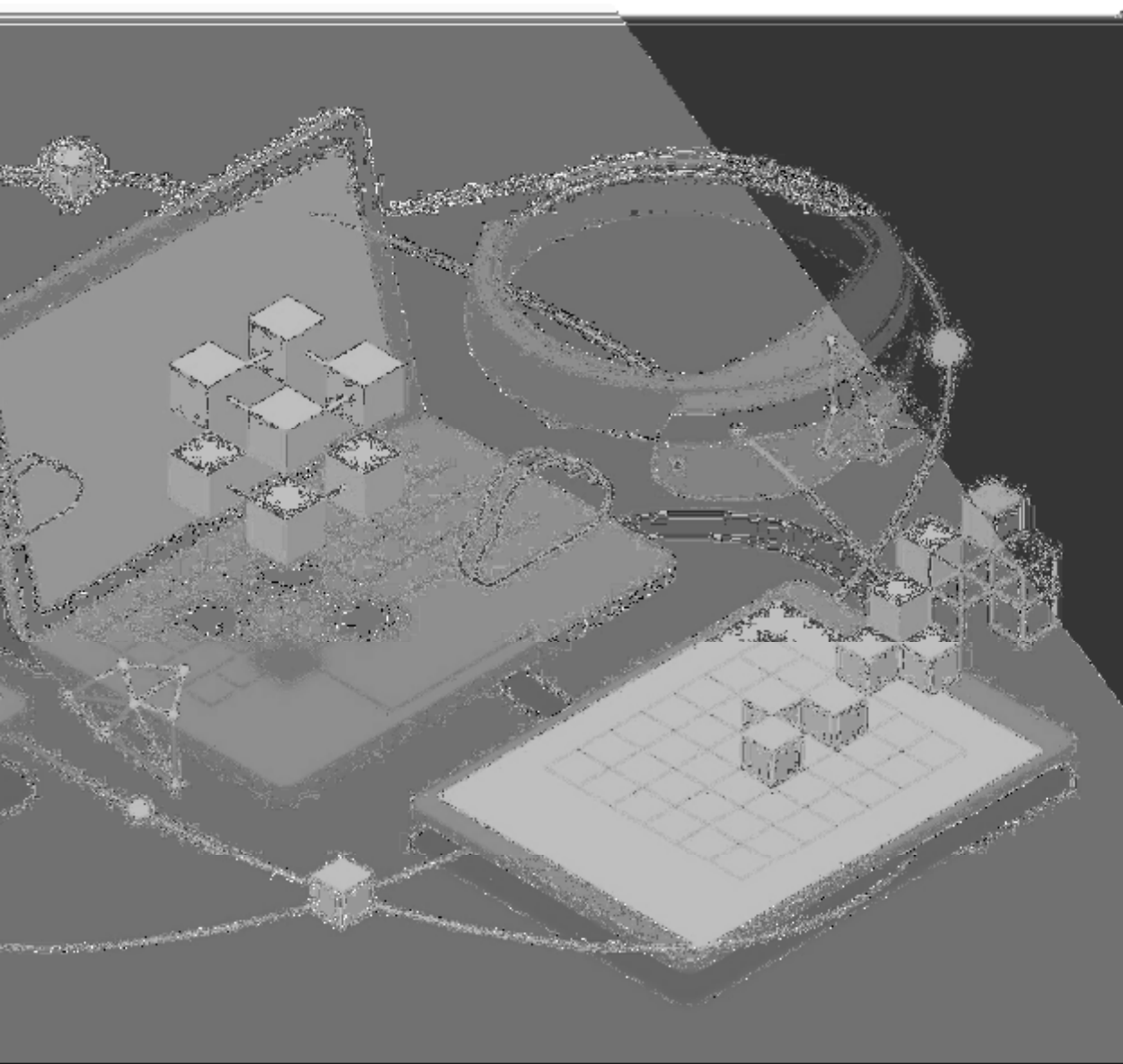


RASPBERRY PI SERVER BASED ON DOCKER

Node-red, MQTT, Node-red dashboard

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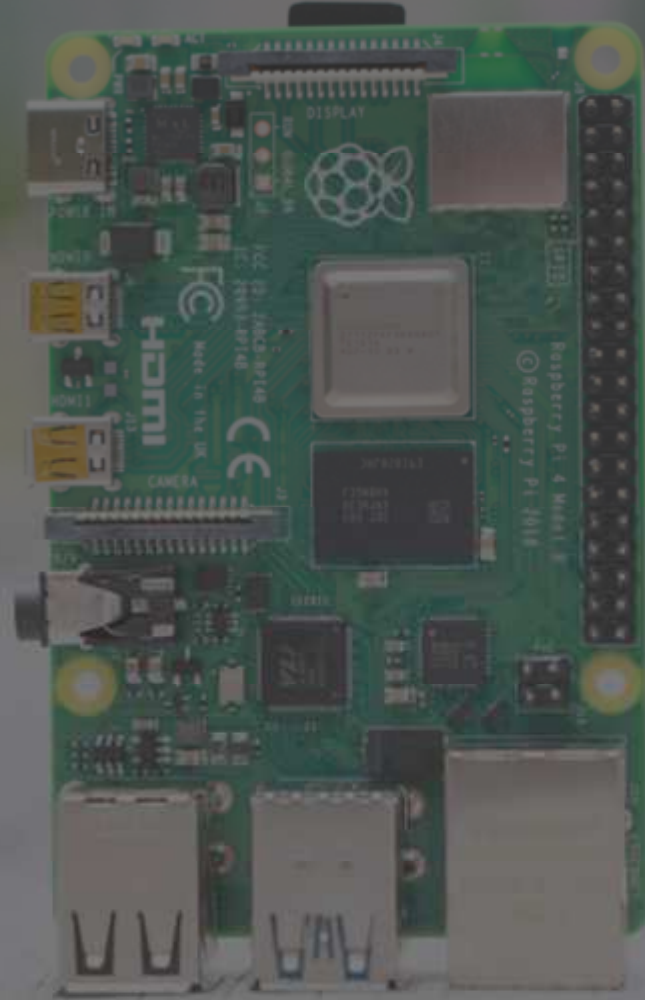


01

PENGENALAN

GOAL

- Memahami sistem Docker pada RaspberryPi
- Menggunakan headless Rpi
- Instalasi docker dengan IoTStack
- Koneksi ESP32 – Rpi dengan MQTT
- Menampilkan data sensor melalui mqtt dashboard



RASPBERRY PI

Raspberry Pi Boards



Raspberry Pi 4 Model B



Raspberry Pi 3 Model A+



Raspberry Pi 3 Model B+



Raspberry Pi Zero



Raspberry Pi 3 Model B



Raspberry Pi 2 Model B



Raspberry Pi 1 Model B+



Raspberry Pi 1 Model A+



Raspberry Pi Zero W

RASPBERRY PI 3



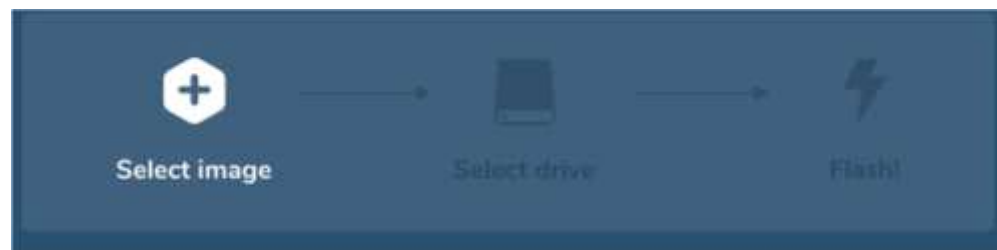
4x USB
Power micro usb
HDMI display
Camera interface
Ethernet
GPIO



Mico sd

INSTALL SDCARD

- Download image
- Connect sdcard
- Find Raspberry pi *.img
- Flash



INSTALL MENGGUNAKAN RASPBERRY PI IMAGER



SETTING HEADLESS RPI

- Set Open and edit wpa_supplicant.conf
- Scan ip
- Ssh using putty

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
    ssid="YOUR_SSID"
    psk="YOUR_PASSWORD"
}
```

```
C:\Users\estheim>nmap -PN 192.168.0.1/24

Starting Nmap 7.40 ( https://nmap.org ) at 2019-08-04 22:36 SE Asia Standard Time
Nmap scan report for 192.168.0.101
Host is up (0.013s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
5900/tcp   open  vnc
MAC Address: B8:27:EB:34:DB:6F (Raspberry Pi Foundation)
```

```
estheim@Machina:~$ ssh pi@192.168.0.101
pi@192.168.0.101's password:
linux raspberrypi 4.14.79-v7+ #1159 SMP Sun Nov 4 17:58:20 GMT 2018 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
last login: Sun Aug  4 22:40:41 2019 from 192.168.0.100
pi@raspberrypi:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Raspbian
Description:  Raspbian GNU/Linux 9.4 (stretch)
Release:      9.4
Codename:     stretch
pi@raspberrypi:~$
```

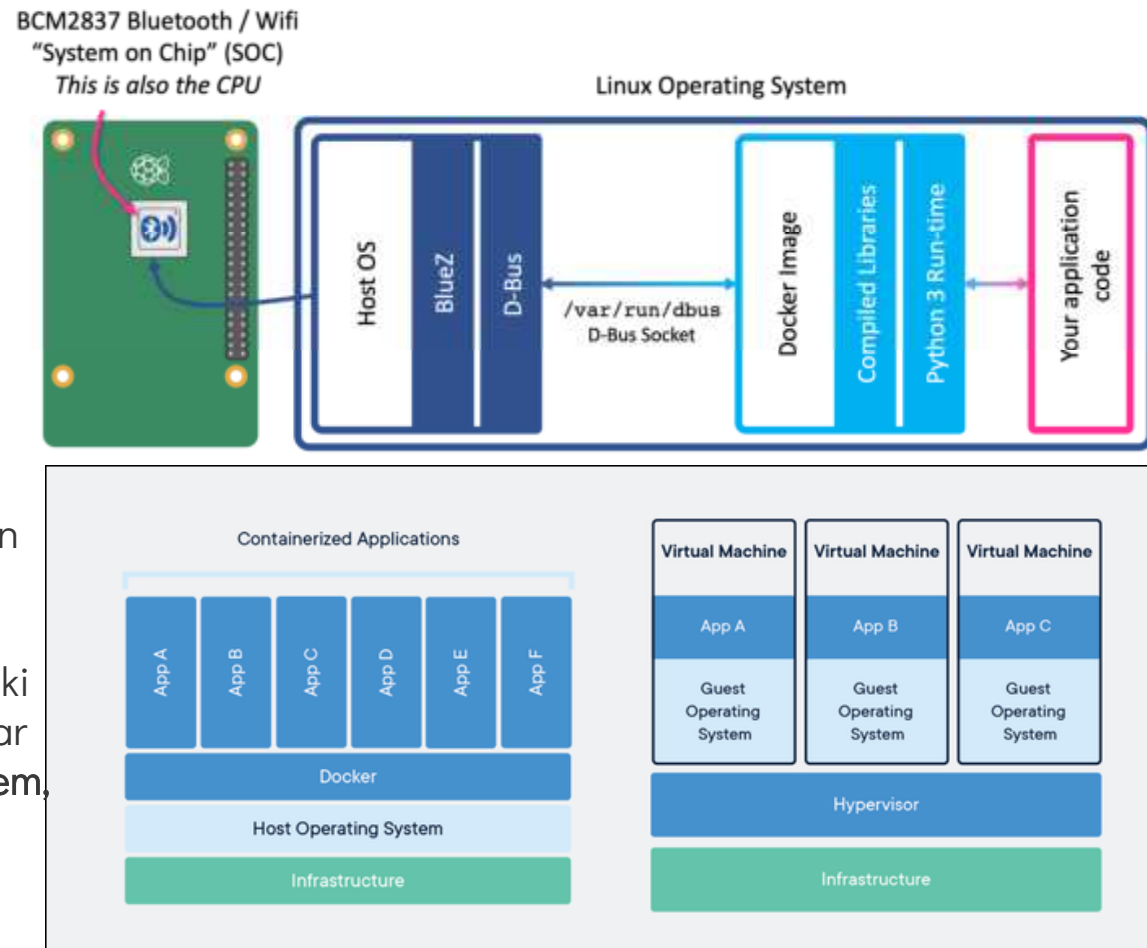


DOCKER RPI

IoT Stack untuk docker pada raspberry pi

DOCKER

Docker adalah platform perangkat lunak yang memungkinkan Anda membuat, menguji, dan menerapkan aplikasi dengan cepat. Docker mengemas perangkat lunak ke dalam unit standar yang disebut **kontainer** yang memiliki semua yang diperlukan perangkat lunak agar dapat berfungsi termasuk **pustaka, alat sistem, kode, dan waktu proses**.





INSTALL DAN RUN DOCKER

Connect to Rpi `ssh pi@raspberrypi.local`

1. Install curl:

```
sudo apt install -y curl
```

Run the following command:

```
curl -fsSL https://raw.githubusercontent.com/Sensorslot/IOTstack/master/install.sh | bash
```

2. Run the menu and choose your containers:

```
cd ~/IOTstack
```

```
./menu.sh
```

Bring up your stack:

```
cd ~/IOTstack
```

```
docker-compose up -d
```



pi@raspberrypi: ~/IoTstack

IOTstack Main Menu

```
-> Build Stack <-  
  Docker Commands  
Miscellaneous Commands  
Backup and Restore  
Native Installs  
Exit
```

SERVICE TO INSTALL

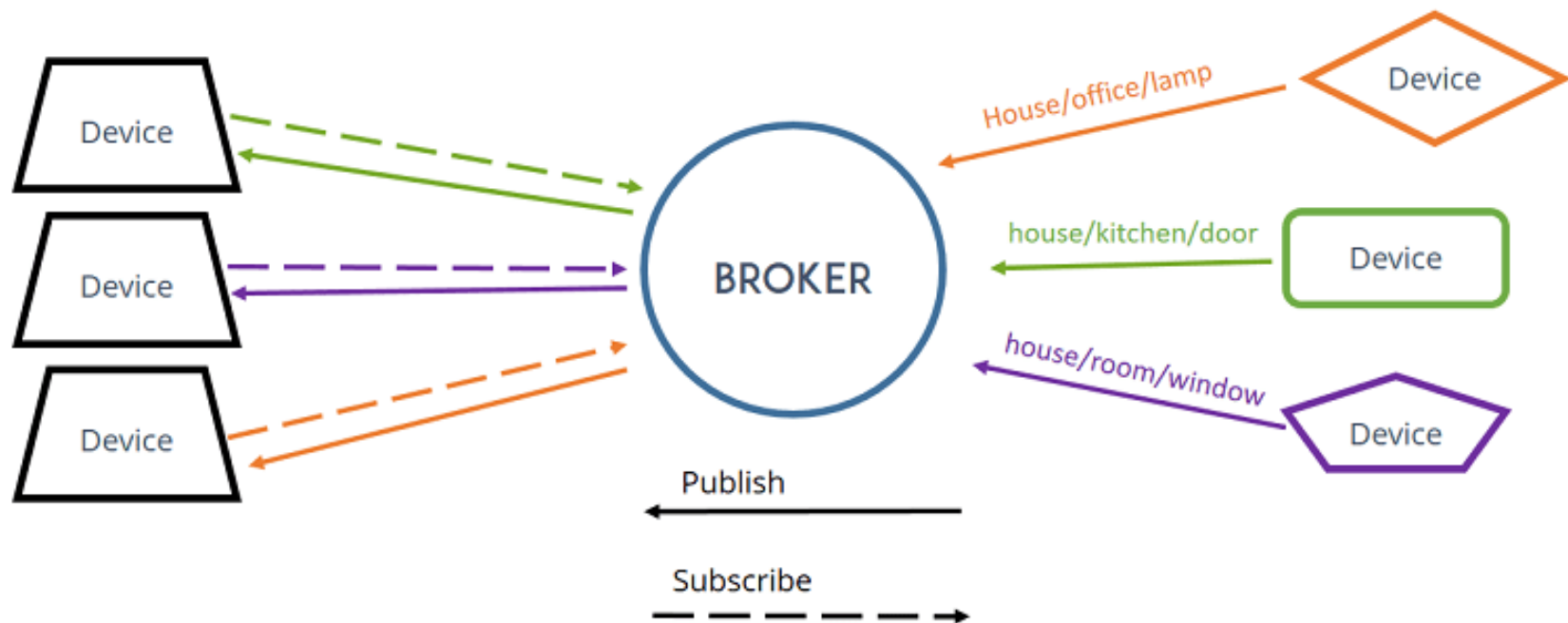
- Nodered
- Portainer-ce
- Mosquito
- Influxdb
- Grafana

The logo features a large, dark gray triangle pointing upwards, centered on a white background. To the left of the triangle is a light gray triangle pointing to the right. A thin gray line extends from the top right corner of the dark triangle towards the top right corner of the image.

MQTT SERVER

Mosquito

MQTT



TENTANG TOPIC

- Struktur dibatasi "/" misal
 /workshop/esp32/sensor/status
 /workshop/esp32/sensor/control
 /workshop/esp32/sensordht11
 /workshop/room/alarm
- Wild card topic dan subtopic
 # (hash character) – multi level wildcard
 + (plus character) -single level wildcard
- Case sensitive

Mosquitto

TOPIC	VALUE
\$SYS/broker/version	mosquitto version 1.4.10
\$SYS/broker/timestamp	Fri, 22 Dec 2017 08:19:25 +0000
\$SYS/broker/uptime	2251623 seconds
\$SYS/broker/clients/total	2
\$SYS/broker/clients/inactive	0
\$SYS/broker/clients/disconnected	0
\$SYS/broker/clients/active	2
\$SYS/broker/clients/connected	2
\$SYS/broker/clients/expired	0
\$SYS/broker/clients/maximum	3
\$SYS/broker/messages/stored	61
\$SYS/broker/messages/received	419773



NODE RED DASHBOARD

Dashboard mqtt menggunakan node-red dashboard

INSTALL NODE RED IN PC

<https://nodered.org/docs/getting-started/local>

```
PS C:\Users\User> node-red
15 Jun 10:54:39 - [info]

Welcome to Node-RED
=====

15 Jun 10:54:39 - [info] Node-RED version: v2.2.2
15 Jun 10:54:39 - [info] Node.js version: v16.15.1
15 Jun 10:54:39 - [info] Windows_NT 10.0.19043 x64 LE
15 Jun 10:54:41 - [info] Loading palette nodes
15 Jun 10:54:41 - [info] Settings file : C:\Users\User\.node-red\settings.js
15 Jun 10:54:41 - [info] Context store : 'default' [local/memory]
15 Jun 10:54:41 - [info] User directory : C:\Users\User\.node-red
15 Jun 10:54:41 - [warn] Projects disabled : editorTheme.projects.enabled=false
15 Jun 10:54:41 - [info] Flow file : C:\Users\User\.node-red\flows.json
15 Jun 10:54:41 - [info] Creating new flow file
15 Jun 10:54:41 - [warn]

Your flow credentials file is encrypted using a system-generated key.

If the system-generated key is lost for any reason, your credentials
```

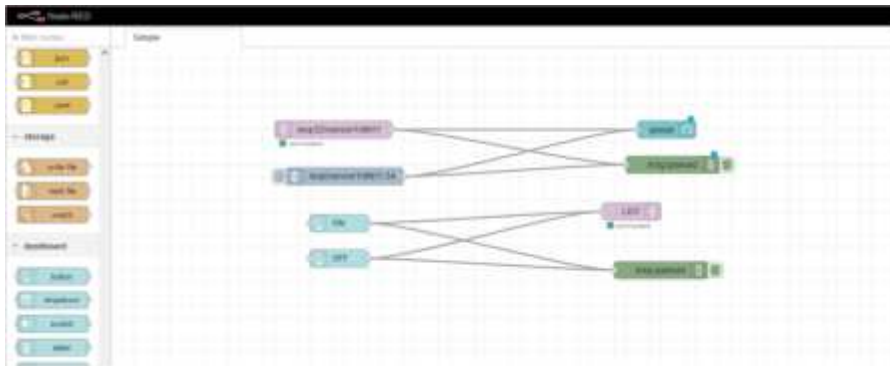
AKSES WEB

Node red flow

<http://localhost:1880>

Node red UI

<http://localhost:1880/ui>





SETTING NODE MQTT

```
client.subscribe(topic);  
# dalam callback subscribe  
if (payload[0]==1) {  
    digitalWrite(18, HIGH);  
} else if (payload[0]==0) {  
    digitalWrite(18, LOW);  
}
```

```
sprintf(str, "%i", datasensor );  
client.publish(topic, str);
```



THANKS

Do you have any question?

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