



PUB TEMPERATURE MONITORING

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Obiettivi

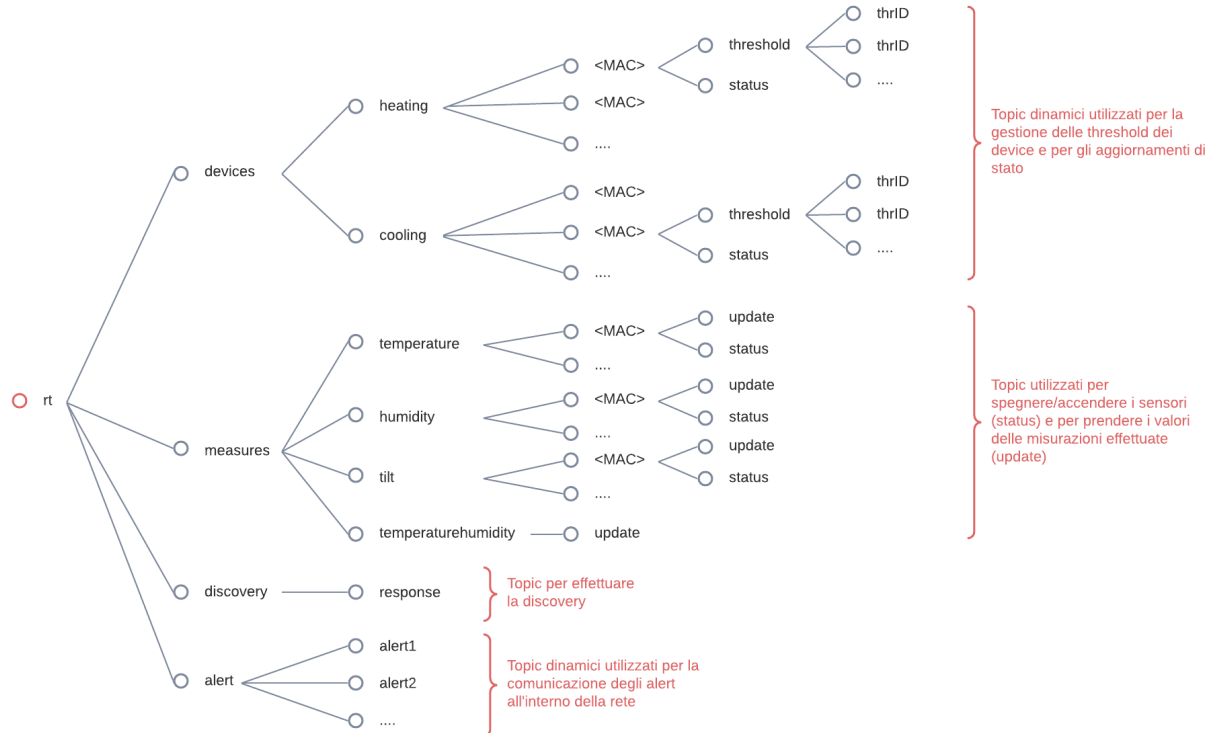


- Realizzare un sistema che permetta la gestione dei dispositivi di temperatura all'interno di un Bar.
- Eseguire un controllo sull'apertura, e chiusura, delle finestre dell'ambiente in cui ci si trova.
- Realizzare una smart network che permetta l'autoconfigurazione dei dispositivi che si collegano.
- Connettere i nodi della rete con MQTT.
- Utilizzare le Weather API per monitorare le previsioni meteo.
- Creare un'interfaccia web dinamica
- Costruire un sistema che offre grande dinamicità e resistenza ai fallimenti

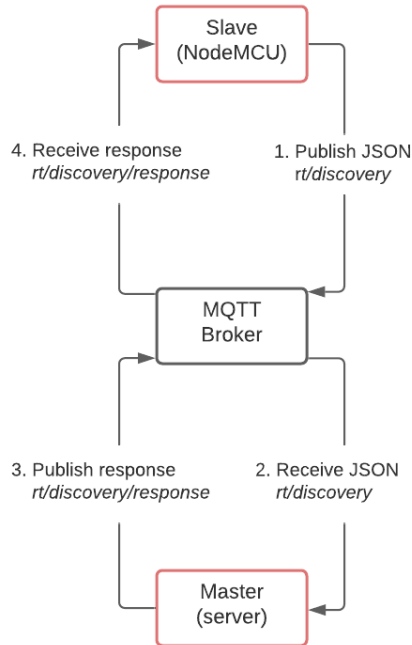
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MQTT



Fase di discovery



JSON discovery request structure

Device general info
(mac, name, description, type)

Threshold
(id, name, description, type, value)

Observes
(measureID)

Sensors
(id, name, status)

Alerts
(alertID)

JSON discovery response structure

General info
(mac, statusTopic)

Threshold topic
(lthresholdD : topic)

Observes topic
(measureID : topic)

Sensors topic
(sensorID : topic)

Alerts topic
(alertID : topic)

Database info
(connectInfo, pointDevice)

Risparmio energia



Sensing station

- Deep sleep ogni 10 minuti
- Log sulla rete ogni 30 minuti
- Utilizzo EEPROM



Tilt sensor

Deep sleep con risveglio tramite il sensore di tilt *



Heating/cooling

Nessuna strategia di risparmio necessaria

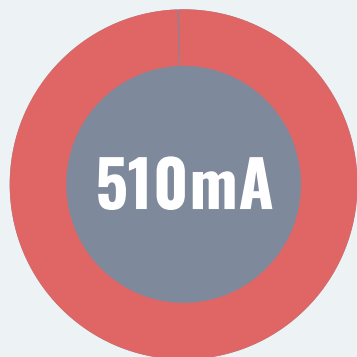


Alert Device

Deep sleep ad intervalli regolari di 5 minuti *

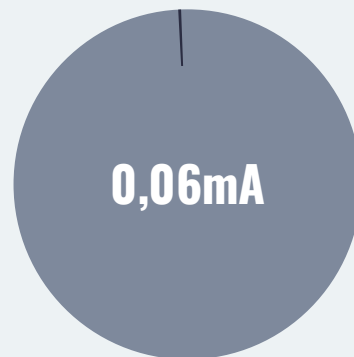


Consumo di corrente (teorico)



No sleep

Senza utilizzare strategie deep sleep, ogni dispositivo alimentato a batteria rimarrebbe attivo per 47 ore continue.



Deep sleep

Utilizzando strategie deep sleep, il sistema potrebbe in linea teorica rimanere attivo per 30 anni circa.

Interazione: Web APP



Home Temperature

Windows Count 0

Devices on 0

Alert

Alert window open: off

Heating

off

40:F5:20:04:3C:94-HT

Available sensors

Temperatura spegnimento

22

Cambia

Temperatura accensione

19.00

Cambia

Cooling

off

40:F5:20:04:3C:94-AC

Available sensors

Temperatura media

28.00

Cambia

Temperatura alta

32.00

Cambia

Umidità alta

80

Cambia

Alert device

40:F5:20:04:3C:94-AL

Available sensors

Tilt sensor

40:F5:20:04:3C:94-TL

Available sensors

tilt

Tilt sensor :
close

Acceso

Sensing station

40:F5:20:04:9E:DE

Available sensors

temperature
humidity

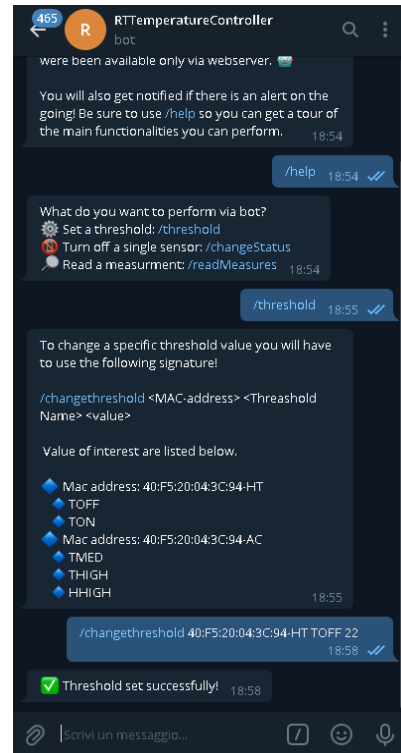
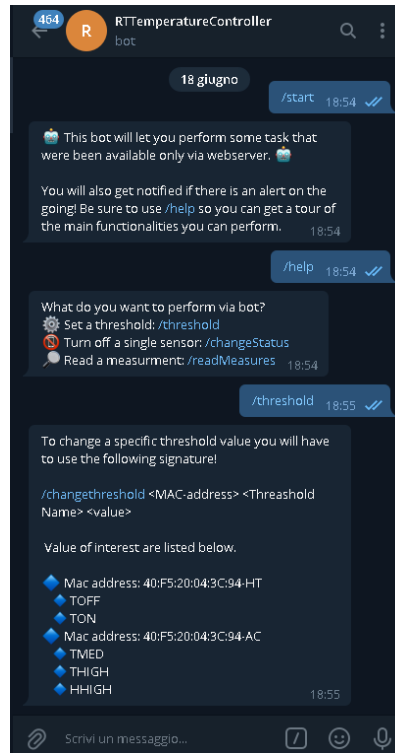
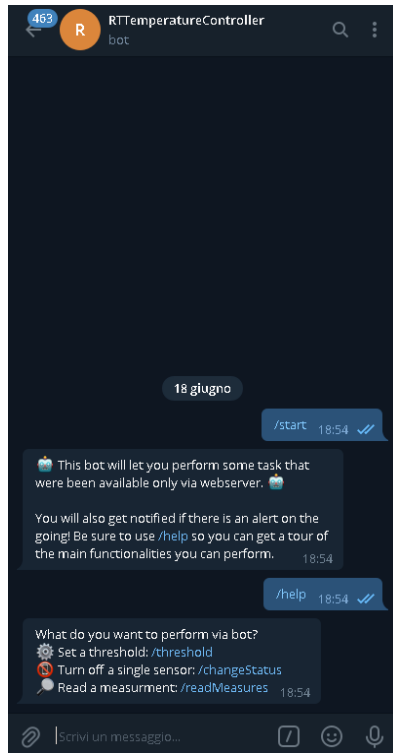
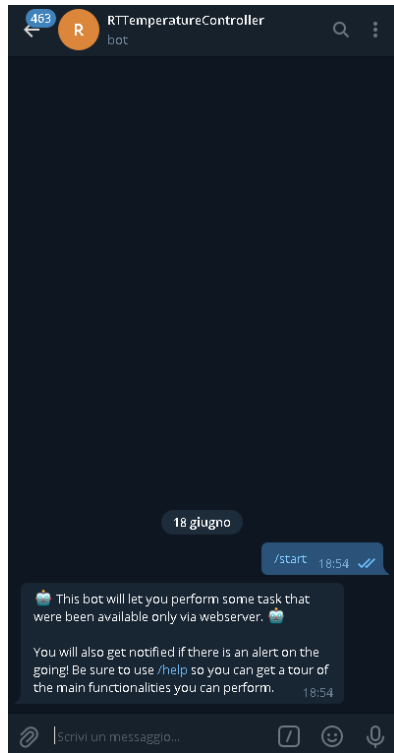
Temperature :
26

Acceso

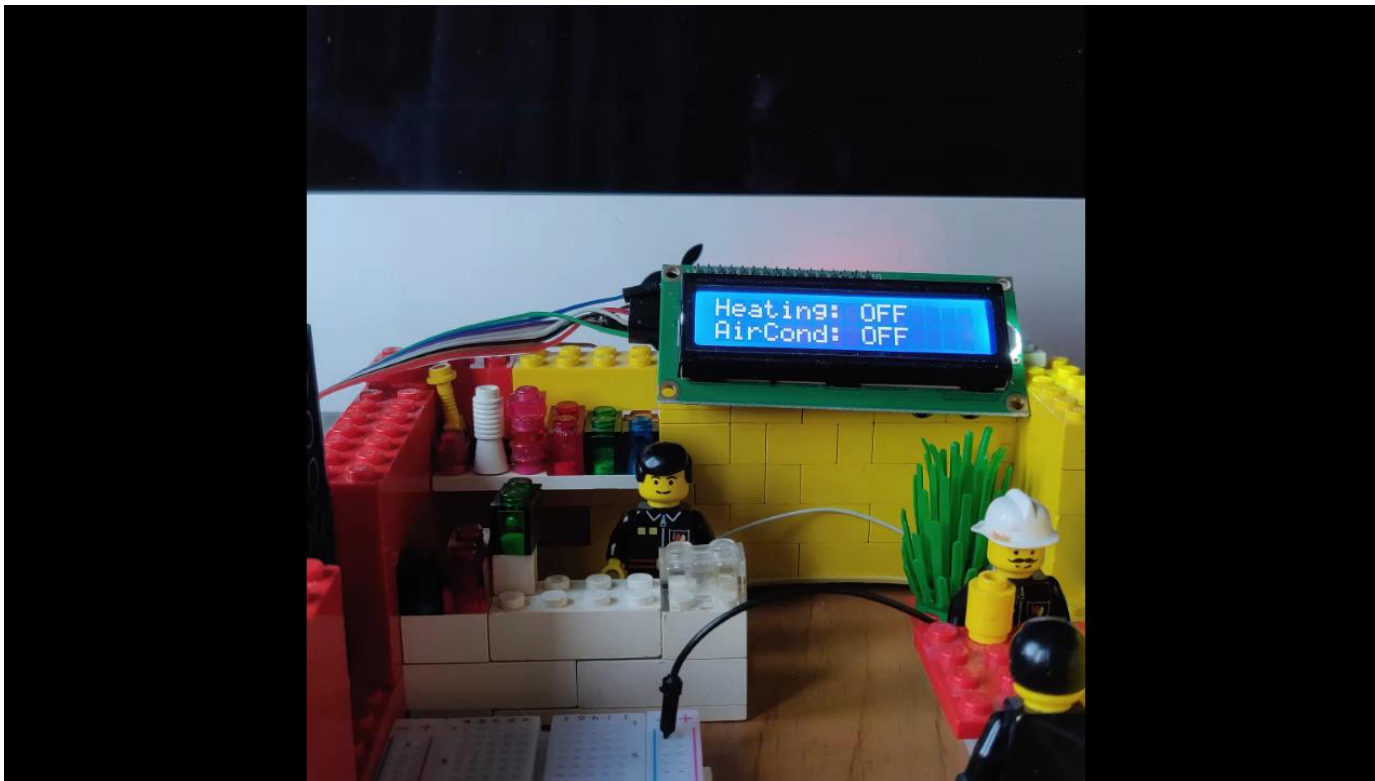
Humidity : 72

Acceso

Interazione: Telegram



Dimostrazione



Dimostrazione



RTTemperatureController
bot

What do you want to perform via bot?
• Set a threshold: /threshold
• Turn off a single sensor: /changeStatus
• Read a measurement: /readMeasures

/threshold 18:54 ✓

To change a specific threshold value you will have to use the following signature:
/changethreshold <MAC-address> <Threshold Name> <value>
Value of interest are listed below.
• Mac address: 40:F5:20:04:3C:94-HT
• TOFF
• TON
• Mac address: 40:F5:20:04:3C:94-AC
• TMED
• THIGH
• HHIGH

/changethreshold 40:F5:20:04:3C:94-HT TOFF 22 18:58 ✓

Threshold set successfully! 18:58

/readMeasures 19:26 ✓

From here you can perform two different task.
Either you just ask all the measures now available via /getMeasure, or you could use the following signature: /getMeasure <MAC-address> <Name>
Value of interest are listed below.
• Mac address: 40:F5:20:04:3C:94-TL
• Tilt sensor
• Mac address: 40:F5:20:04:9E:DE
• Temperature
• Humidity

/getMeasure 19:26 ✓

Tilt sensor: close
Temperature: 26.00
Humidity: 72.00 19:26

Temperature control
127.0.0.1:8181

Home Temperature

Alert
Alert window open: off

Heating
off
40:F5:20:04:3C:94-HT
Available sensors
Temperatura spegnimento: 22 Cambia
Temperatura accensione: 19.00 Cambia

Cooling
off
40:F5:20:04:3C:94-AC
Available sensors
Temperatura media: 28.00 Cambia
Temperatura alta: 32.00 Cambia
Umidità alta: 80 Cambia

Alert device
40:F5:20:04:3C:94-AL
Available sensors

Tilt sensor
40:F5:20:04:3C:94-TL
Available sensors
Tilt sensor: close Accesso

Sensing station
40:F5:20:04:9E:DE
Available sensors
temperature
humidity
Temperature: 26 Accesso
Humidity: 72 Accesso

Windows Count 0 Devices on 0

Dimostrazione



The screenshot shows a web application interface for a temperature control system. The interface is divided into two main sections: a left sidebar for configuration and a main content area for monitoring and control.

Left Sidebar (Configuration):

- Header:** RTTemperatureController bot
- Instructions:** To change a specific threshold value you will have to use the following signature!
/changethreshold <MAC address> <Threshold Name> <value>
- Value of interest are listed below:**
 - Mac address: 40:F5:20:04:3C:94-HT
 - TON
 - Mac address: 40:F5:20:04:3C:94-AC
 - TMED
 - THIGH
 - HHIGH
- Actions:**
 - /changethreshold 40:F5:20:04:3C:94-HT TONFF 22 (18:58) ✓
 - Threshold set successfully! (18:58) ✓
 - /readMeasures (19:26) ✓
- From here you can perform two different task:**
Either you just ask all the measures now available via /getMeasure, or you could use the following signature!
/getMeasure <MAC address> <Name>
- Value of interest are listed below:**
 - Mac address: 40:F5:20:04:3C:94-TL
 - Tilt sensor
 - Mac address: 40:F5:20:04:9E:DE
 - Temperature
 - Humidity
- Actions:**
 - /getMeasure (19:26) ✓
 - /getMeasure (19:59) ✓
- Results:**
 - Tilt sensor: close
 - Temperature: 26.00
 - Humidity: 72.00 (19:26)
 - Tilt sensor: open
 - Temperature: 26.00
 - Humidity: 72.00 (19:59)

Main Content Area (Monitoring and Control):

Home Temperature

Alert
Alert window open: **off**

Heating
off
40:F5:20:04:3C:94-HT
Available sensors
Temperatura spegnimento: 22 (Cambia)
Temperatura accensione: 19.00 (Cambia)

Cooling
off
40:F5:20:04:3C:94-AC
Available sensors
Temperatura media: 28.00 (Cambia)
Temperatura alta: 32.00 (Cambia)
Umidità alta: 80 (Cambia)

Alert device
40:F5:20:04:3C:94-AL
Available sensors

Tilt sensor
40:F5:20:04:3C:94-TL
Available sensors
tilt
Tilt sensor: open (Accesso)

Sensing station
40:F5:20:04:9E:DE
Available sensors
temperature
humidity
Temperature: 26.00 (Accesso)
Humidity: 72.00 (Accesso)

Top Bar: Windows Count 1, Devices on 0

Dimostrazione



The image displays two side-by-side screenshots. The left screenshot shows a Telegram chat interface with a bot named 'RTemperatureController'. The chat history includes commands like '/changeThreshold' and '/readMeasures', and responses showing sensor data (Temperature, Humidity, Tilt sensor) and a warning 'We caught an alert for you! Alert window open: Is now on'. The right screenshot shows a web dashboard titled 'Temperature control' with a URL of '127.0.0.1:8181'. The dashboard has a top bar with 'Windows Count 1' and 'Devices on 1'. It features several sections: 'Alert' (Alert window open: on), 'Heating' (off), 'Cooling' (on), 'Tilt sensor' (40:F5:20:04:3C:94-TL, Available sensors: tilt, Tilt sensor: open, Acceso), 'Alert device' (40:F5:20:04:3C:94-AL, Available sensors), and 'Sensing station' (40:F5:20:04:9E:DE, Available sensors: temperature, humidity, Temperature: 26, Humidity: 70, both with 'Acceso' buttons).

Dimostrazione



The screenshot displays a web application interface for a temperature control system. The interface is divided into two main sections: a chat interface on the left and a main control panel on the right.

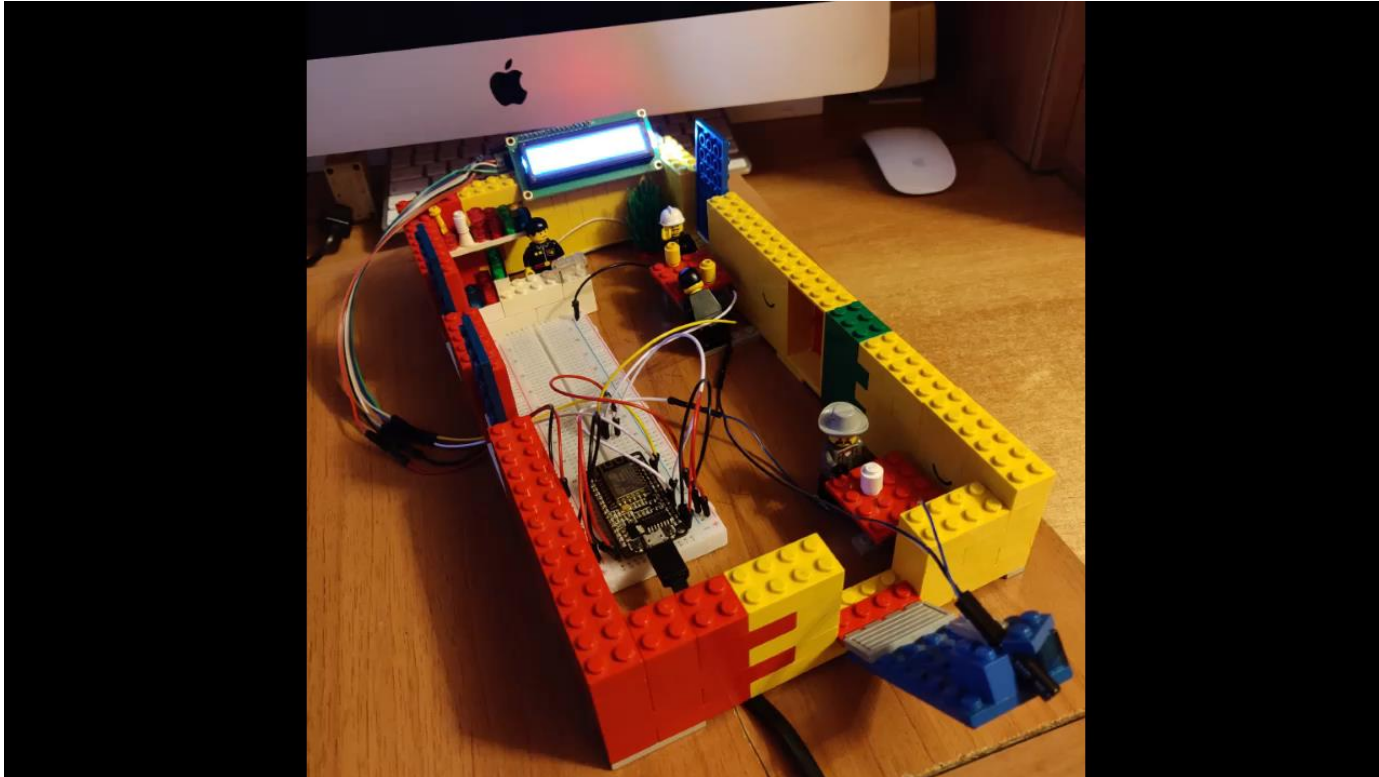
Chat Interface (Left):

- Header: **RTTemperatureController** bot
- Mac address: 40:F5:20:04:3C:94-HT
- TOFF
- TON
- Mac address: 40:F5:20:04:3C:94-AC
- TMED
- THIGH
- HHIGH
- 18:55
- Message: `/changethreshold 40:F5:20:04:3C:94-HT TOFF 22`
- 18:58
- Message: `/readMeasures`
- 19:26
- Message: `/getMeasure`
- 19:26
- Message: `/getMeasure`
- 19:53
- Message: `/getMeasure`
- 20:12
- Message: `/getMeasure`
- 20:13

Main Control Panel (Right):

- Header: **Home Temperature**
- Windows Count: 0
- Devices on: 1
- Alert**
Alert window open: off
- Heating**
off
40:F5:20:04:3C:94-HT
Available sensors
Temperatura spegnimento: 21.00
Temperatura accensione: 19.00
- Cooling**
on
40:F5:20:04:3C:94-AC
Available sensors
Temperatura media: 28.00
Temperatura alta: 32.00
Umidità alta: 80
- Tilt sensor**
40:F5:20:04:3C:94-TL
Available sensors
tilt
Tilt sensor: close
Accesso
- Alert device**
40:F5:20:04:3C:94-AL
Available sensors
- Sensing station**
40:F5:20:04:9E:DE
Available sensors
temperature
humidity
Temperature: 26
Humidity: 70

Dimostrazione



Conclusioni

01

Devices

Utilizzo di un NodeMCU per ogni device, in modo da togliere la simulazione degli stessi.

02

Risparmio energetico

Adottare tecniche di deep sleep anche per i due dispositivi per cui non è stato possibile farlo (*alert device* e *tilt sensor*).





Grazie dell'attenzione

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