嵌入式系統
Lab 06: Raspberry Pi GPIO 與 MCS Cloud

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DHT-11 溫溼度感應器

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Reference

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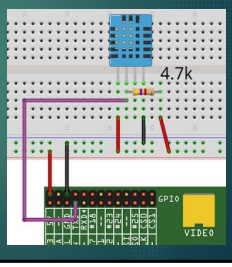
- http://yehnan.blogspot.tw/2015/05/raspberry-pidht11.html



Packages

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- 先安裝所需套件：
  $ sudo apt-get update
  $ sudo apt-get install build-essential python-dev

  然後下載，進入該目錄：
  $ git clone https://github.com/adafruit/Adafruit_Python_DHT.git
  $ cd Adafruit_Python_DHT

  安裝：
  $ sudo python setup.py install

  接著就能讀取DHT11了，執行寫好的範例Python程式：
  $ cd examples
  $ sudo ./AdafruitDHT.py 11 4
  Temp=27.0*C Humidity=81.0%

  其中參數11代表DHT11，4代表我把它接到Raspberry Pi的GPIO 4。

Modify AdafruitDHT.py

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```
# Try to grab a sensor reading.  Use the read_retry method which will retry up
# to 15 times to get a sensor reading (waiting 2 seconds between each retry).
humidity, temperature = Adafruit_DHT.read_retry(sensor, pin)
# Un-comment the line below to convert the temperature to Fahrenheit.
# temperature = temperature * 9/5.0 + 32
# Note that sometimes you won't get a reading and
# the results will be null (because Linux can't
# guarantee the timing of calls to read the sensor).
# If this happens try again!
if humidity is not None and temperature is not None:
    print('Temp={0:0.1f}*  Humidity={1:0.1f}%'.format(temperature, humidity))
else:
    print('Failed to get reading. Try again!')
    sys.exit(1)
```

Modify AdafruitDHT.py

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- While true:
  - humidity, temperature = Adafruit_DHT.read_retry(sensor, pin)
  - if humidity is not None and temperature is not None:
    - print('Temp={0:0.1f}* Humidity={1:0.1f}%'.format(temperature, humidity))
  - else:
    - print('Failed to get reading. Try again!')
    - sys.exit(1)

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CHECK POINT #1

讓 DHT-11 可以一直量測溫溼度

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MCS Cloud

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Reference

- http://oranwind.org/-linkit-smart-7688-chuan-song-sensor-data-dao-mediatek-cloud-sandbox-mcs/

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MediaTek Cloud Sandbox (MCS) 端

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Step 1:

- 到 MediaTek Cloud Sandbox (MCS) 網站申請帳號
- https://mcs.mediatek.com

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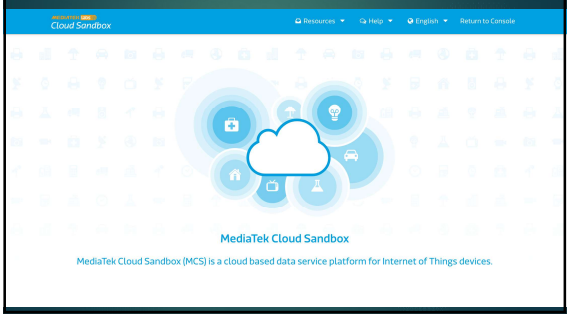
Step 2: Login



Step 3:點擊 開始

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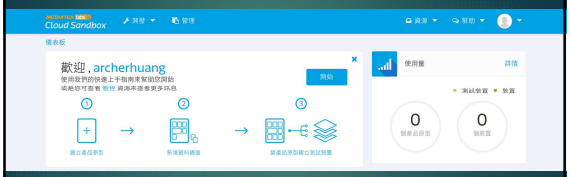

Step 4: 開發 -> 產品原型

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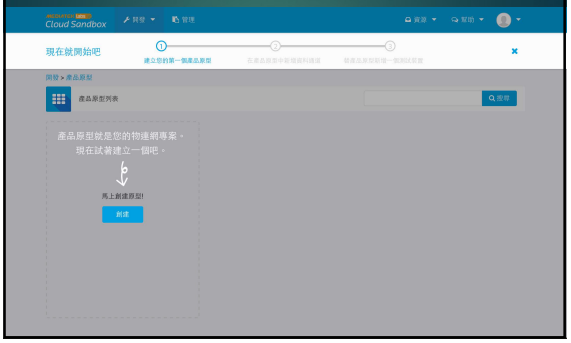

Step 5.

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- 輸入 產品原型名稱、產品原型版本、硬體平台、產業、應用程式 再按儲存
- 硬體平台raspberry pi

Step 6

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- 點擊 Last updated prototype 中的 raspberry pi

Step 7 Add Data Channel

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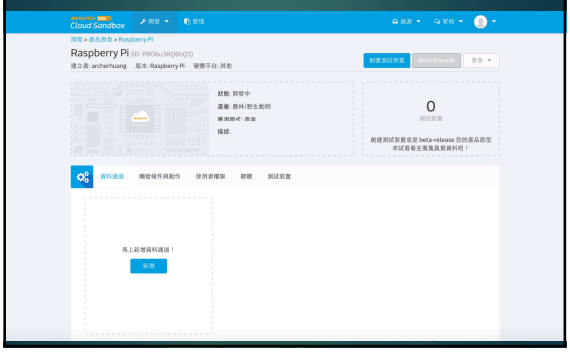

Step 8. Display -> Add

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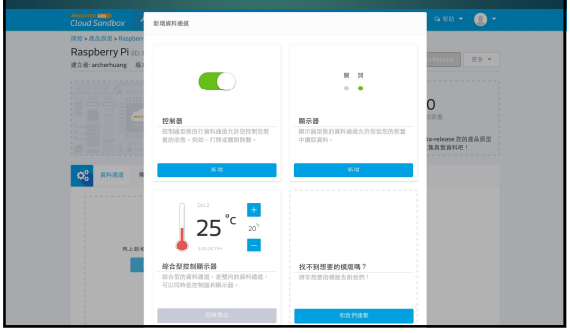

Step 10

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- Repeat Step 7 – 8.
- Add data channel

Step 9

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- 輸入 Temperature 的 Data channel name、Data channel Id、Data type、Unit 再按 Save

Step 11

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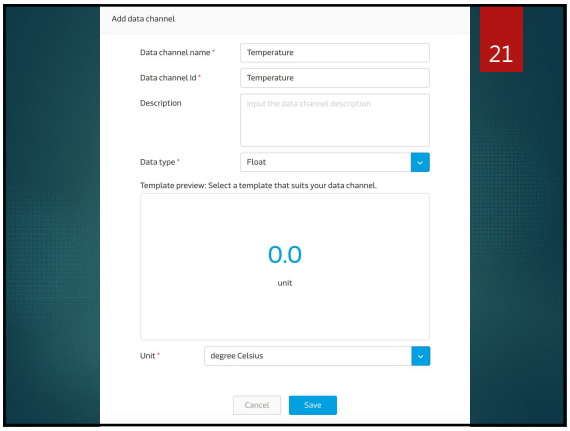
- 輸入 Humidity 的 Data channel name、Data channel Id、Data type、Unit 再按 Save



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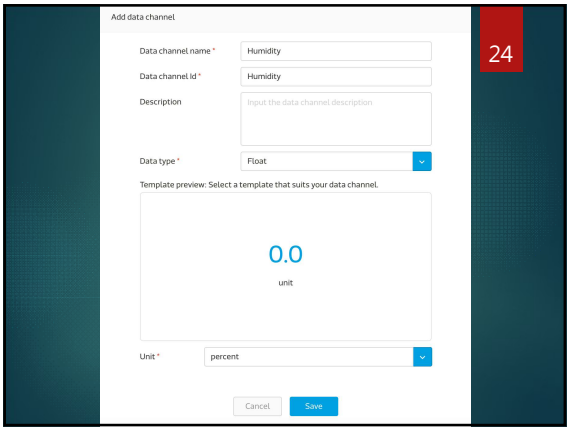

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Step 12

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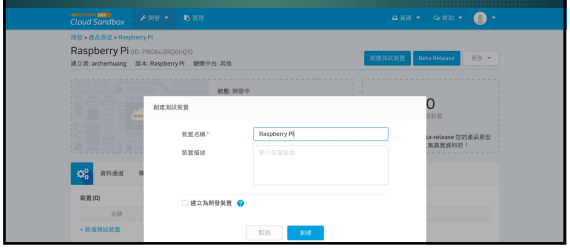
- 點擊 Create Test device 輸入 raspberry pi



Step 13 – Modify AdafruitDHT.py

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```
import time
import sys
import httplib, urllib
import json
deviceId = "D2WKWKcr "
deviceKey = "LcWuC5DykgbM5fqS"
def post_to_mcs(payload):
        headers = {"Content-type": "application/json", "deviceKey": deviceKey}
        not_connected = 1
        while (not_connected):
                try:
                        conn = httplib.HTTPConnection("api.mediatek.com:80")
                        conn.connect()
                        not_connected = 0
                except (httplib.HTTPException, socket.error) as ex:
                        print "Error: %s" % ex time.sleep(10)
                        # sleep 10 seconds
        conn.request("POST", "/mcs/v2/devices/" + deviceId + "/datapoints", json.dumps(payload),
headers)
        response = conn.getresponse()
        print( response.status, response.reason, json.dumps(payload), time.strftime("%c"))
        data = response.read()
        conn.close()
```


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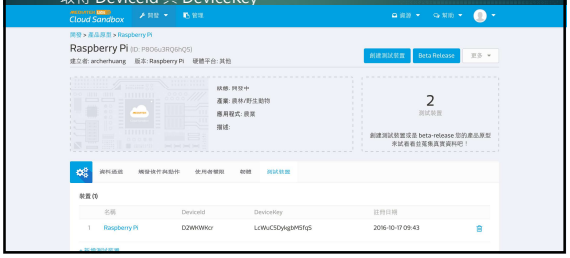
- 點擊下方 裝置 中的 Raspberry Pi 取得 DeviceId 與 DeviceKey



Modify AdafruitDHT.py

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```
h0, t0= Adafruit_DHT.read_retry(sensor, pin)

payload = {"datapoints":[{"dataChnId":"Humidity","values":{"value":h0}},
        {"dataChnId":"Temperature","values":{"value":t0}}]}
post_to_mcs(payload)
time.sleep(10)
```


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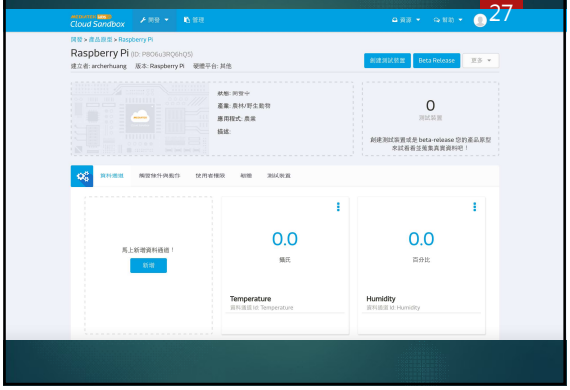

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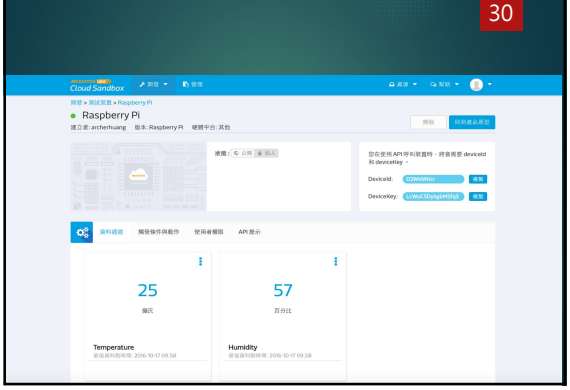

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CHECK POINT 2

MCS CLOUD 持續顯示溫濕度

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MCS Cloud 顯示開關狀態

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新增資料通道 -> 顯示器

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資料型態 -> 開關

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Python 讀取 GPIO 狀態

```
import RPi.GPIO as GPIO
GPIO.setmode(GPIO.BCM)
GPIO.setup(24, GPIO.IN, pull_up_down=GPIO.PUD_UP)
```

```
while True:

        SwitchStatus = GPIO.input(24)
        if( SwitchStatus == 0):
                print('Button pressed')
        else:
                print('Button released')
```

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將開關狀態上傳 MCS Cloud

```
payload = {"datapoints":[{"dataChnId":"Hum","values":{"value":humidity}}
,{"dataChnId":"Temp","values":{"value":temperature}},{"dataChnId":"SwitchStatus"
,"values":{"value":SwitchStatus}}]}
```

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CHECK POINT 3

MCS CLOUD 持續顯示溫濕度及開關狀態

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MCS Cloud 控制 LED

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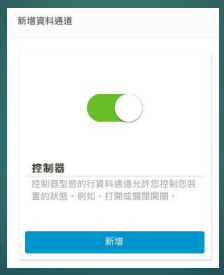
新增資料通道 控制器



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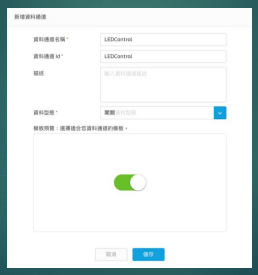
資料通道 -> LEDControl



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Reference

- http://draw-bruce.blogspot.tw/2016/01/iot10-mediatek-cloud-sandbox.html

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CHECK POINT 4

MCS CLOUD 直接控制 LED