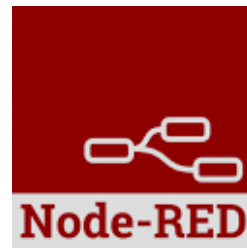
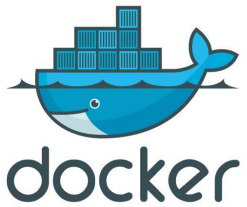




# FLASS

Project further visualizing your LASS Data with  
Freeboard, Thingspeak, Slack, Node Red, Docker

---



FRRUT.COM / Howard  
howard.weng@gmail.com

# 1. Overview

---

# Objectives

## 1. See both forest and tree.

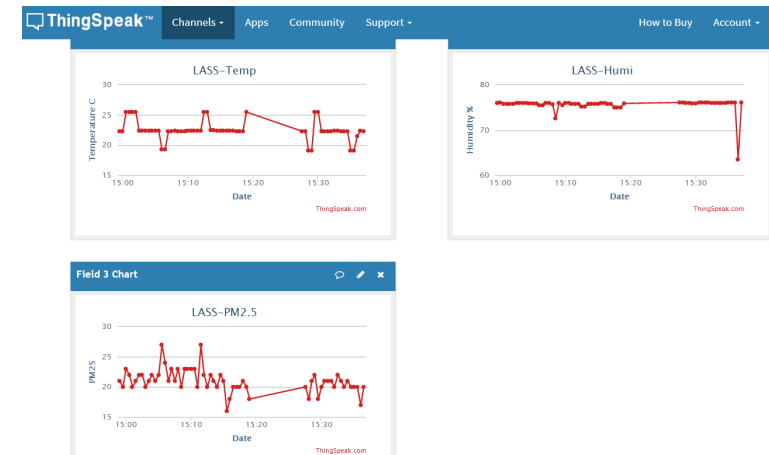
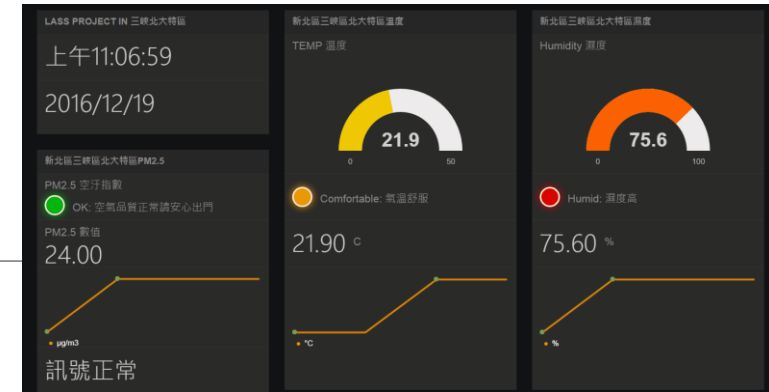
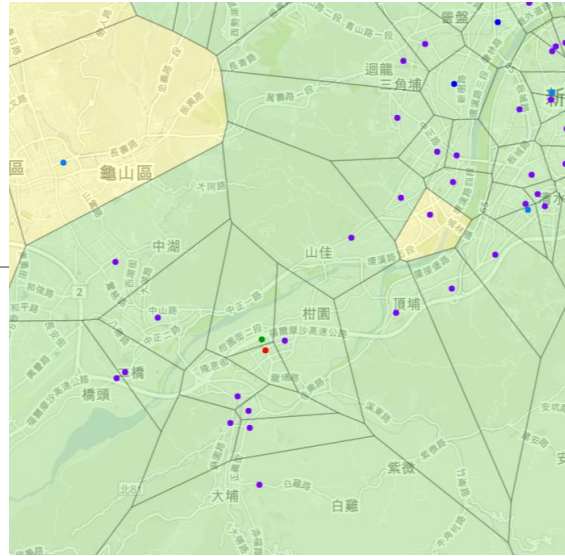
- Contribute to big data
- I care more few special area

## 2. Learning IoT Cloud Services

- Official LASS Arduino Linkit One device
- Docker, Node Red, MQTT, Freeboard, Thingspeak, Slack

## 3. My own way to present my data

- Thingspeak is free and good.
  - Official Python way through pc. <https://lass.hackpad.com/LASS-Field-Try-1--QhgzWXt3HJd>
- Freeboard is pretty
  - Better visualize your own data
  - Access it from anywhere, any connected devices.
- Open Source, Fully customizable

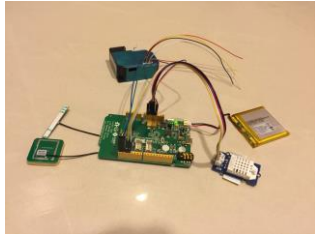


# System map

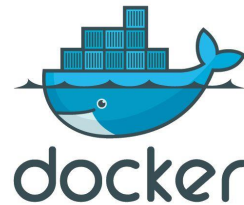
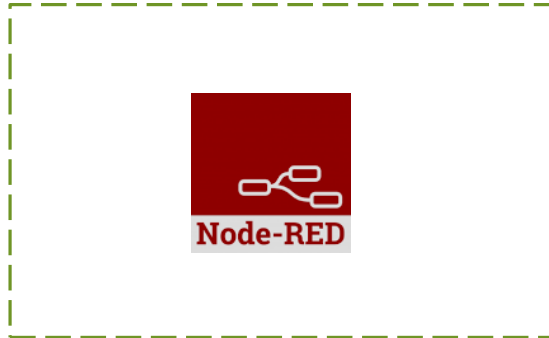
Input

Servers/App

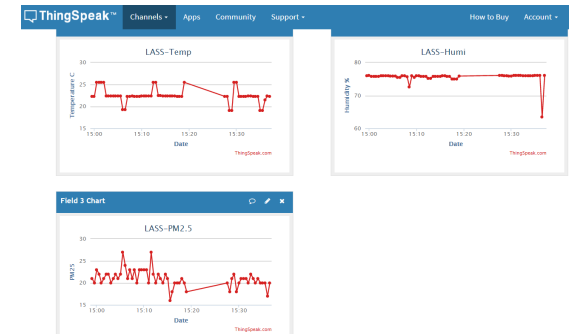
Output



LASS/Test/howard/PM25



http://



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howard.weng@gmail.com

# Official Linkit One LASS code

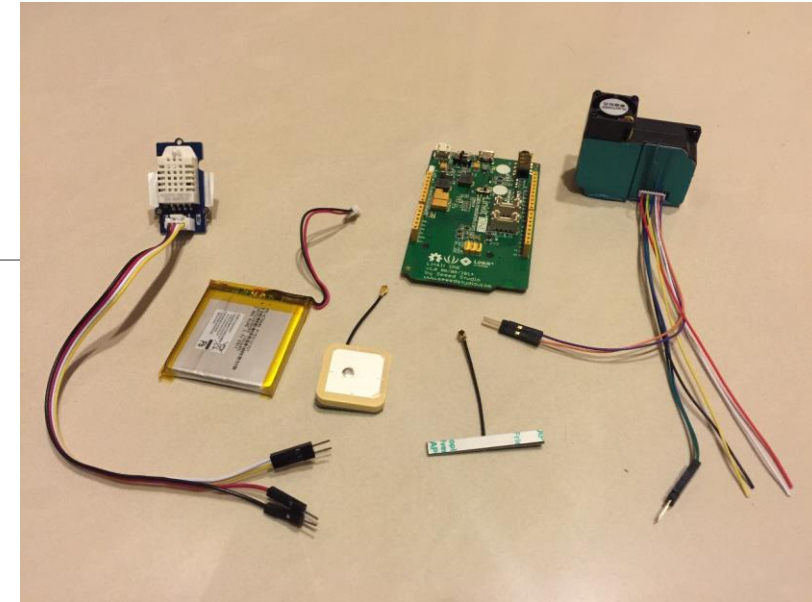
---

## Basic:

- Hardware and instruction on Linkit-One
- <https://lass.hackpad.com/ep/pad/static/7xQSIilMeGU>
- Official code:
- [https://github.com/LinkItONEDevGroup/LASS/tree/master/Device\\_LinkItOne/LASS](https://github.com/LinkItONEDevGroup/LASS/tree/master/Device_LinkItOne/LASS)

## Customized configuration code

<https://github.com/howardweng/FLASS>



# Linkit One Customized Code

---

## 1. WIFI Credentials

```
5 //System default wifi setting: SSID=LASS, PASS=LASS123456, WIFI_AUTH=LWIFI_WPA
6 #define WIFI_SSID "Crystalant 2.4G"           // REPLACE: your network SSID (name)
7 #define WIFI_PASS "11111" // REPLACE: your network password (use for WPA, or use as key for WEP)
8 #define WIFI_AUTH LWIFI_WPA //Default:LWIFI_WPA // choose from LWIFI_OPEN, LWIFI_WPA, or LWIFI_WEP.
9 //-----
```

# Arduino Code V.S. Log

## Code

### 2. ID and Topic

```
17 //Step 3:MQTT info
18 //MQTT-IoT
19 #define MQTT_PROXY_IP "gpssensor.ddns.net"
20 #define DEVICE_TYPE "LinkItONE"
21 #define DEVICE_ID "Howard222"
22 #define MQTT_TOPIC_PREFIX "LASS/Test/howard"
23 #define PARTNER_ID "LASS-Partner1"
```

You can change your name  
for special topic to subscribe

## Log

-----Loop ID: 9 tick= 2768582 -----

SensorValue(RecordID):92.00

SensorValue(BatteryLevel):100.00

SensorValue(BatteryCharging):1.00

SensorValue(speed):0.00

SensorValue(debugwifi):1.00

[Performance TIME-COUNT]:29894

[SENSOR-DUST-PM2.5]:15.00

[SENSOR-DUST-PM10]:18.00

SensorValue(Temperature):22.30

SensorValue(Humidity):75.50

Reconnecting to MQTT Proxy

Packet MQTT Topic:LASS/Test/howard/PM25

lver\_format=3|FAKE\_GPS=1|app=PM25|ver\_app=0.8.3|device\_id=Howard222|ti

MQTT Companion channel published...

MQTT sending

LED:Wifi and gps ready!

# Linkit One Code customization

## 3. Fake GPS location information

```
27 //Do you want to use gps? 0:YES 1:FAKE GPS
28 #define FAKE_GPS 1 // FAKE_GPS : 0: default format with gps, 1: def
29 //NOTICE:If you choose 1 modify "FAKE" GPS location. Fill info belo
30 const char gps_lat[]="24.94925"; // device's gps latitude
31 const char gps_lon[]="121.37639"; // device's gps longitude
32 const char gps_alt[]="30.0"; // device's gps altitude
33 #define GPS_SIGNAL_NOCHECK 1 // 0: log or send only when GPS have
34
35 //NOTICE: for Field TRY-PM2.5 DONT CHANGE AFTER THIS LINE! --2015
36 //-----
37 //Step 5:About LASS
38 #define APP_ID (APPTYPE_SYSTEM_BASE+1) // REPLACE: th
```

<http://www.gps-coordinates.net/>

## 4. APP type



# Standard LASS string from Serial

1. Make sure your data is running on Linkit One. As long as your format is this. You can use this system

standard LASS string (Other data format data need customization)

#15/PM25

|ver\_format=3|FAKE\_GPS=1|app=PM25|ver\_app=0.8.3|device\_id=Howard222|tick=81534326|date=2016-12-20|time=08:54:25|device=LinkItONE|s\_0=2727.00|s\_1=100.00|s\_2=1.00|s\_3=0.00|s\_4=8.00|s\_d0=7.00|s\_t0=22.80|s\_h0=82.20|s\_d1=8.00|gps\_lat=24.948171|gps\_lon=121.376746|gps\_fix=1|gps\_num=9|gps\_alt=30.0

#16/Temp

#17/Humidity

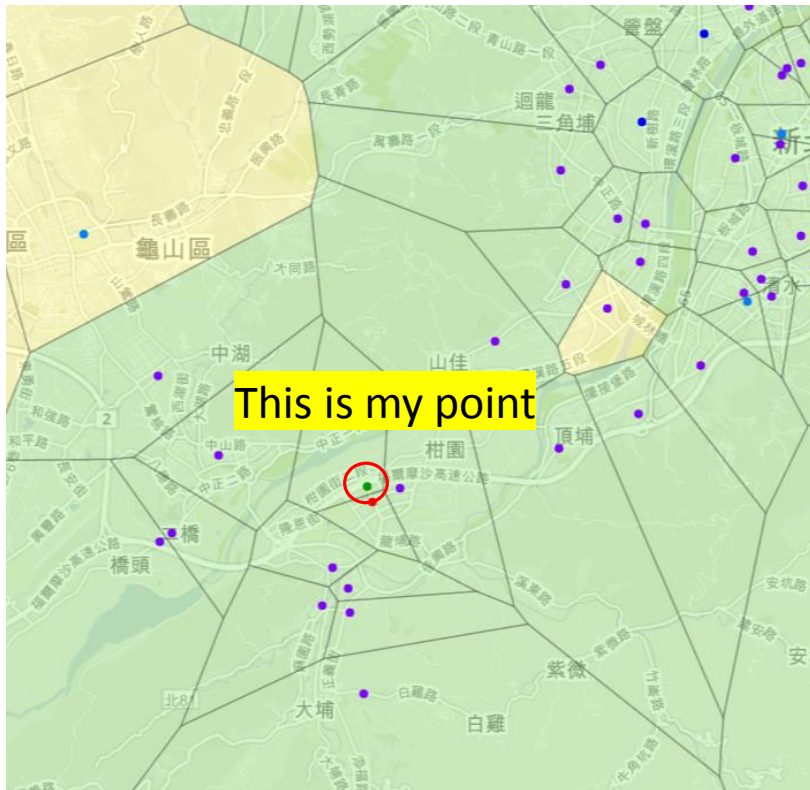
```
COM11 (Linkit ONE)
SensorValue(Humidity):78.70
Reconnecting to MQTT Proxy
Pack MQTT Topic:LASS/Test/howard/PM25
|ver_format=3|FAKE_GPS=1|app=PM25|ver_app=0.8.3|device_id=Howard222|tick=69696488|date=2016-12-20|time
MQTT Companion channel published...
MQTT sending
LED:Wifi and gps ready!

-----Loop ID: 2332, current tick= 69726383 -----
SensorValue(RecordID):2332.00
SensorValue(BatteryLevel):100.00
SensorValue(BatteryCharging):1.00
SensorValue(speed):0.00
SensorValue(debugwifi):8.00
[Performance TIME-COUNT]:29895
[SENSOR-DUST-PM2.5]:9.00
[SENSOR-DUST-PM10]:9.00
SensorValue(Temperature):23.30
SensorValue(Humidity):77.90
Reconnecting to MQTT Proxy
Pack MQTT Topic:LASS/Test/howard/PM25
|ver_format=3|FAKE_GPS=1|app=PM25|ver_app=0.8.3|device_id=Howard222|tick=69726383|date=2016-12-20|time
MQTT Companion channel published...
MQTT sending
LED:Wifi and gps ready!
```

# Make sure your data on LASS system.

## Standard LASS view

2. You can see your point at. Weather Map: <http://nrl.iis.sinica.edu.tw/LASS/GIS/voronoi/voronoi.html#>



3. You can see individual on this .

[http://nrl.iis.sinica.edu.tw/LASS/show.php?device\\_id=Howard222](http://nrl.iis.sinica.edu.tw/LASS/show.php?device_id=Howard222)

deviceID

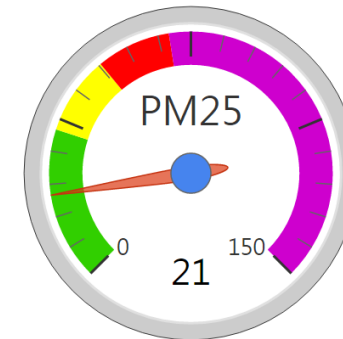


PM2.5 即時資訊

時間：Mon Dec 19 2016 15:30:25 GMT+0800 (台北標準時間)

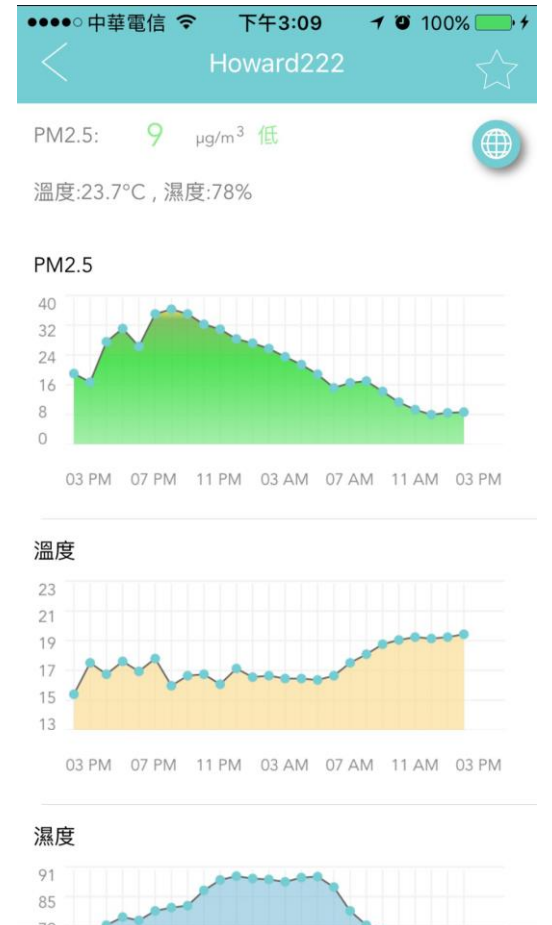
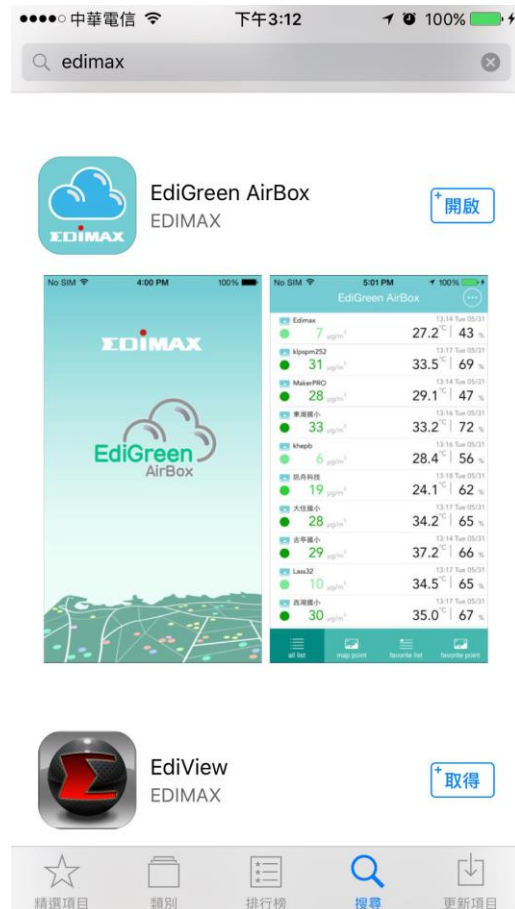
地點：Shulin District, New Taipei City, Taiwan 238

溫度：22.3°C；濕度：76.1%

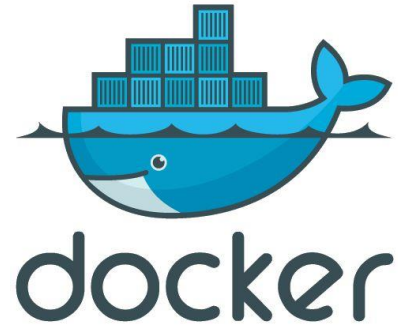


- 一般民眾活動建議：  
正常戶外活動。
- 敏感性族群活動建議：  
正常戶外活動。

# APP: Airbox







## 2. System environment setting

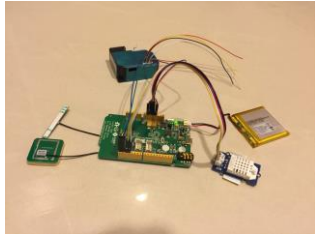
---

# System map

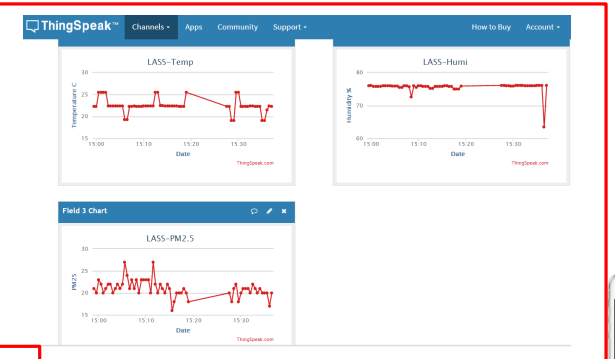
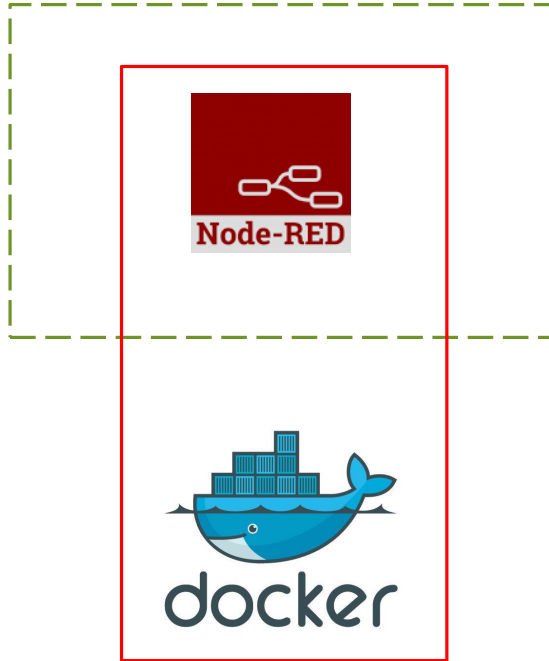
Input

Servers/App

Output



LASS/Test/howard/PM25



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# ThingSpeak.com

[Private View](#)[Public View](#)[Channel Settings](#)[API Keys](#)[Data Import](#)

## Channel Settings

Percentage complete 50%

Channel ID 202375

Name

LASS

Description

LASS data from Node-Red

Field 1

Temperature C



Field 2

Humidity %



Field 3

PM25



Private View

Public View

Channel Settings

API Keys

Data Import / Export

## Write API Key

Key

ZMMZN5BK YFJDRUWJ

Generate New Write API Key

## Help

API keys enable  
keys are auto-

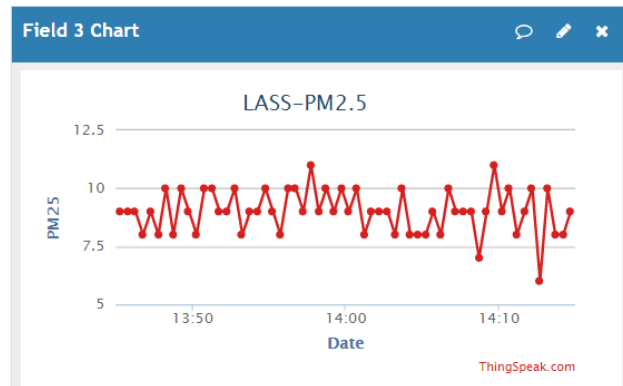
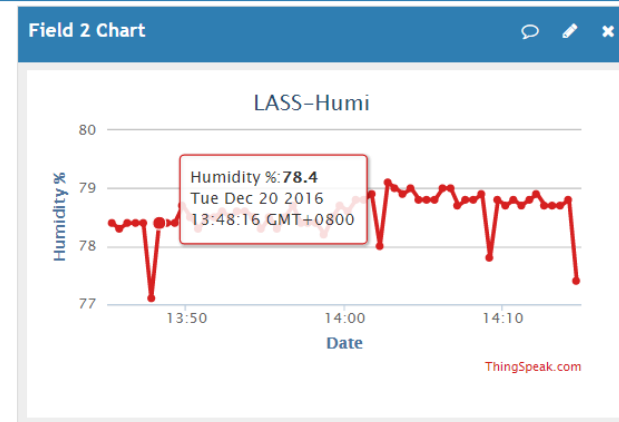
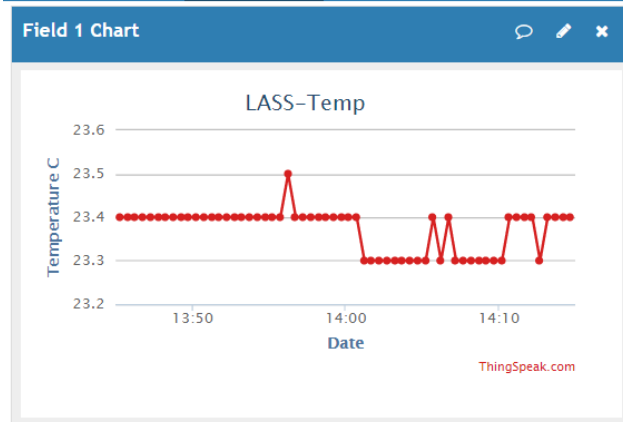
## API Keys

- Write API Key
- Read API Key

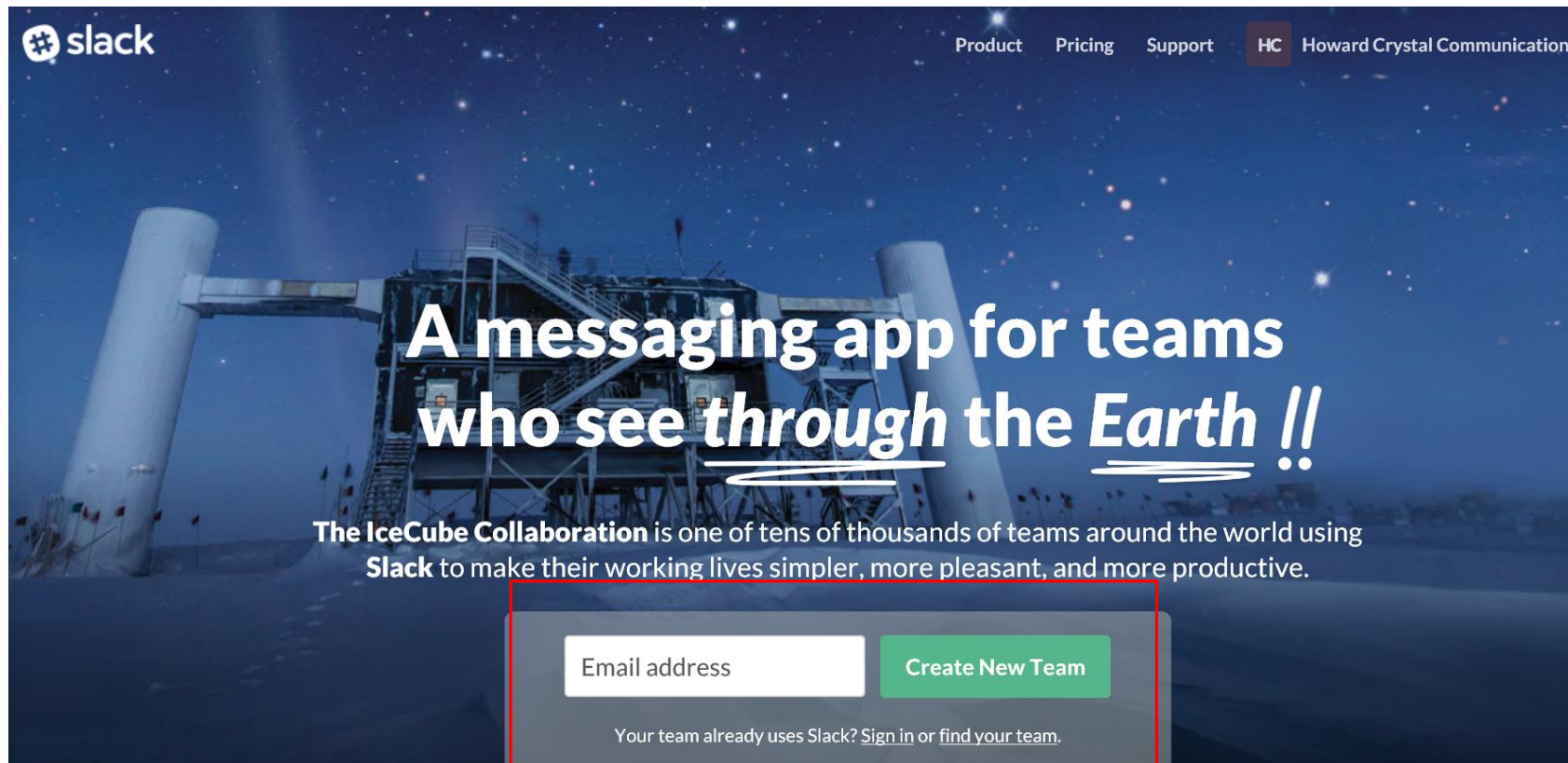


# Thingspeak.com

freeboard



Slack.com

The hero section of the Slack homepage. It features a dark blue background with a starry night sky and a large, white, industrial-looking structure (the IceCube observatory) in the foreground. The Slack logo is in the top left corner. Navigation links for "Product", "Pricing", "Support", and "HC" (Howard Crystal Communication) are in the top right. The main headline is "A messaging app for teams who see through the Earth !!". Below this is a paragraph about the IceCube Collaboration. At the bottom is a registration form with an "Email address" input field, a "Create New Team" button, and a link to sign in or find a team.

slack

Product Pricing Support HC Howard Crystal Communication

# A messaging app for teams who see through the Earth !!

The IceCube Collaboration is one of tens of thousands of teams around the world using **Slack** to make their working lives simpler, more pleasant, and more productive.

Email address [Create New Team](#)

Your team already uses Slack? [Sign in](#) or [find your team](#).

You should consider trying

Howard Crystal...  
@howard

Profile & account

Preferences

Set yourself to away

Help & feedback

HC Howard Crystal Co...  
howardcrystal.slack.com

Invite people

Manage team members

Team settings

Apps & integrations

Customize Slack

Statistics

#general  
0 | Company-wide

howard BOT 12:00 A  
"id":"0400040f","lat

howard BOT 12:10 A  
"id":"0400040f","lat

howard BOT 12:20 A  
"id":"0400040f","lat

howard 12:20 AM  
removed an integration


howard 8:03 PM  
中央


howard 3:36 PM  
ecorder01-1.8cf123  
ecorder01-1.8cf123


# Make Slack even better.


All the tools you use for work, in one place.

webhook

 Incoming WebHooks  
Send data into Slack in real-time.

 Outgoing WebHooks  
Get data out of Slack in real-time.

 Amazon SQS  
A distributed queue messaging service.

 Insping  
Simple Uptime and performance monitoring tool

## Webhook URL

Send your JSON payloads to this URL.

[Show setup instructions](#)

`https://hooks.slack.com/services/T25U2LCTS/B37SD3SQ0/28RRoMS0mPnUZZi`

[Copy URL](#) • [Regenerate](#)

# Docker Cloud

---

Setup Docker Cloud account <https://cloud.docker.com>

[Features](#)[Pricing](#)[Resources](#)[Sign up](#)[Log in with Docker ID](#)

## Docker Cloud

Build, ship, and run - any app, anywhere

Choose your Docker ID

---


Email

---

# Docker Cloud node available for Node-RED

Follow instruction to have one available node from Cloud Providers ( Microsoft Azure, AWS, DigitalOcean..)

- PS. One node with Docker is free of charge. But cloud provider is to initiate a virtual machine with cloud provider, and it is a charge service, but not too expensive. I am using Digital Ocean now, because the registration is easier.

 DOCKER  
CLOUD

+

Get Help ▾


Nodes



☐ Select All


Actions ▾

Bring y

08e54e34-03dc-4929-837a-36ec1...

 Singapore 1 • 512MB

 2  docker


 *docker*


3 days ago

DEPLOYED

# Node-RED customized Docker Image

Docker Image name, please search:    howardweng/howard-node-red-lass

 DOCKER CLOUD

 howardweng

+











Get Help

Services

☐ Select All    Filter by name...

Actions

Create

httpd-dbde72c0	 httpd:latest	🕒 3 days ago	   
howard-node-red-lass-b3480158	 howardweng/howard-node-red-lass:latest	🕒 9 hours ago	   

httpd-dbde72c0

1

RUNNING

 httpd:latest


🕒 3 days ago



howard-node-red-lass-b3480158

1

RUNNING

 howardweng/howard-node-red-lass:latest

🕒 9 hours ago



# Pushing Data to system

---

# 3.1 Pushing data to Thingspeak

---



# Node-Red to bridge Thingspeak

LASS Thingspeak

LASS Freeboard



-----Loop ID: 92, current tick= 2768582

SensorValue(RecordID):92.00

SensorValue(BatteryLevel):100.00

SensorValue(BatteryCharging):1.00

SensorValue(speed):0.00

SensorValue(debugwifi):1.00

[Perfomence TIME-COUNT]:29894

[SENSOR-DUST-PM2.5]:15.00

[SENSOR-DUST-PM10]:18.00

SensorValue(Temperature):22.30

SensorValue(Humidity):75.50

Reconnecting to MQTT Proxy

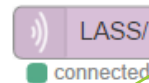
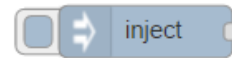
Pack MQTT Topic:LASS/Test/howard/PM25

lver\_format=3|FAKE\_GPS=1|app=PM25|ver\_2

MQTT Companion channel published...

MQTT sending

LED:Wifi and gps ready!



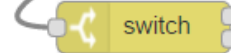
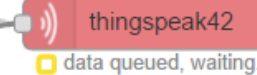
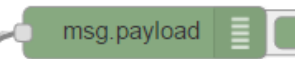
Temperature



Humidity



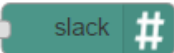
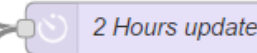
PM2.5 Warning to Slack



High



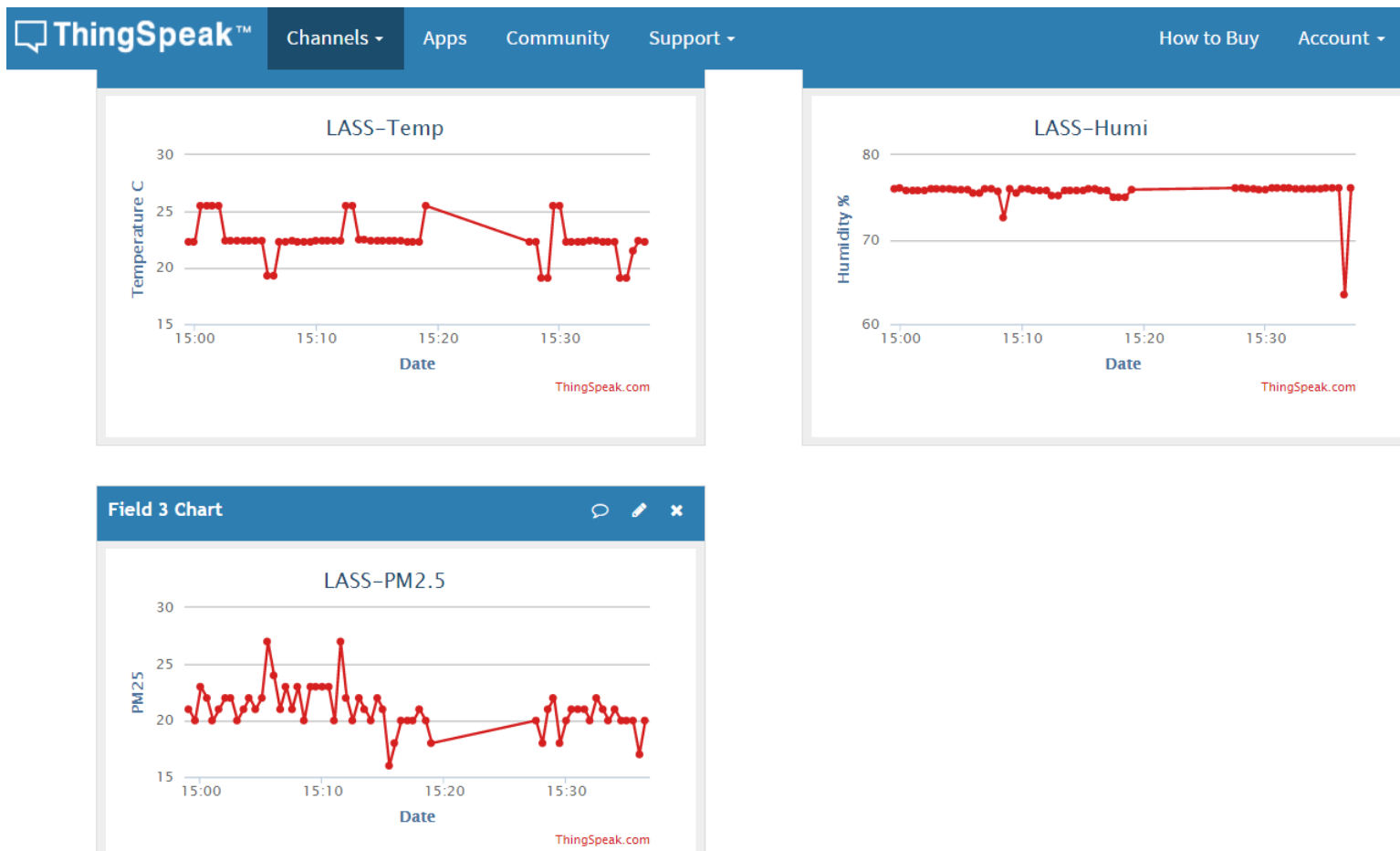
Dangerous



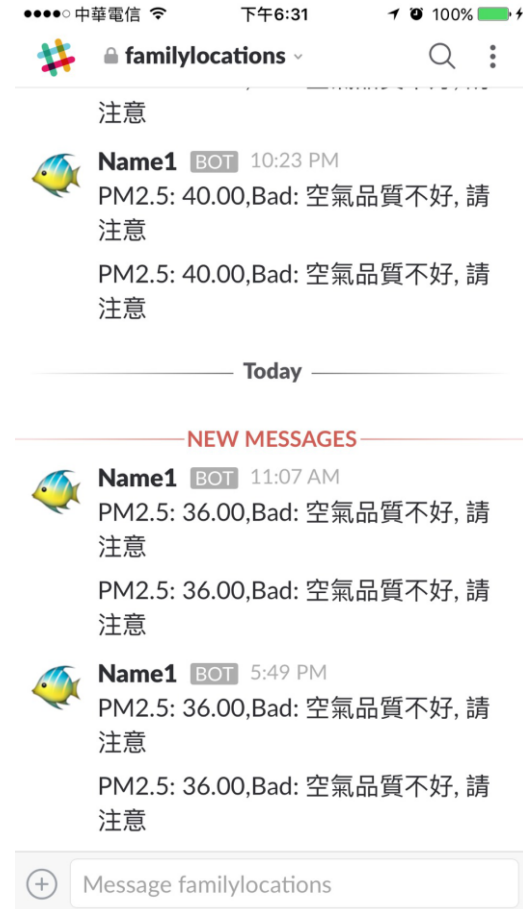
1. Change topic

2. Write API Key

3. Web Hook URL



# Slack



## 3.2. Pushing data to Freeboard

---

# Node-RED to bridge Freeboard

LASS Thingspeak

LASS Freeboard

-----Loop ID: 92, current tick= 2768582 -----

SensorValue(RecordID):92.00

SensorValue(BatteryLevel):100.00

SensorValue(BatteryCharging):1.00

SensorValue(speed):0.00

SensorValue(debugwifi):1.00

[Performance TIME-COUNT]:29894

[SENSOR-DUST-PM2.5]:15.00

[SENSOR-DUST-PM10]:18.00

SensorValue(Temperature):22.30

SensorValue(Humidity):75.50

Reconnecting to MQTT Proxy

Pack MQTT Topic:LASS/Test/howard/PM25

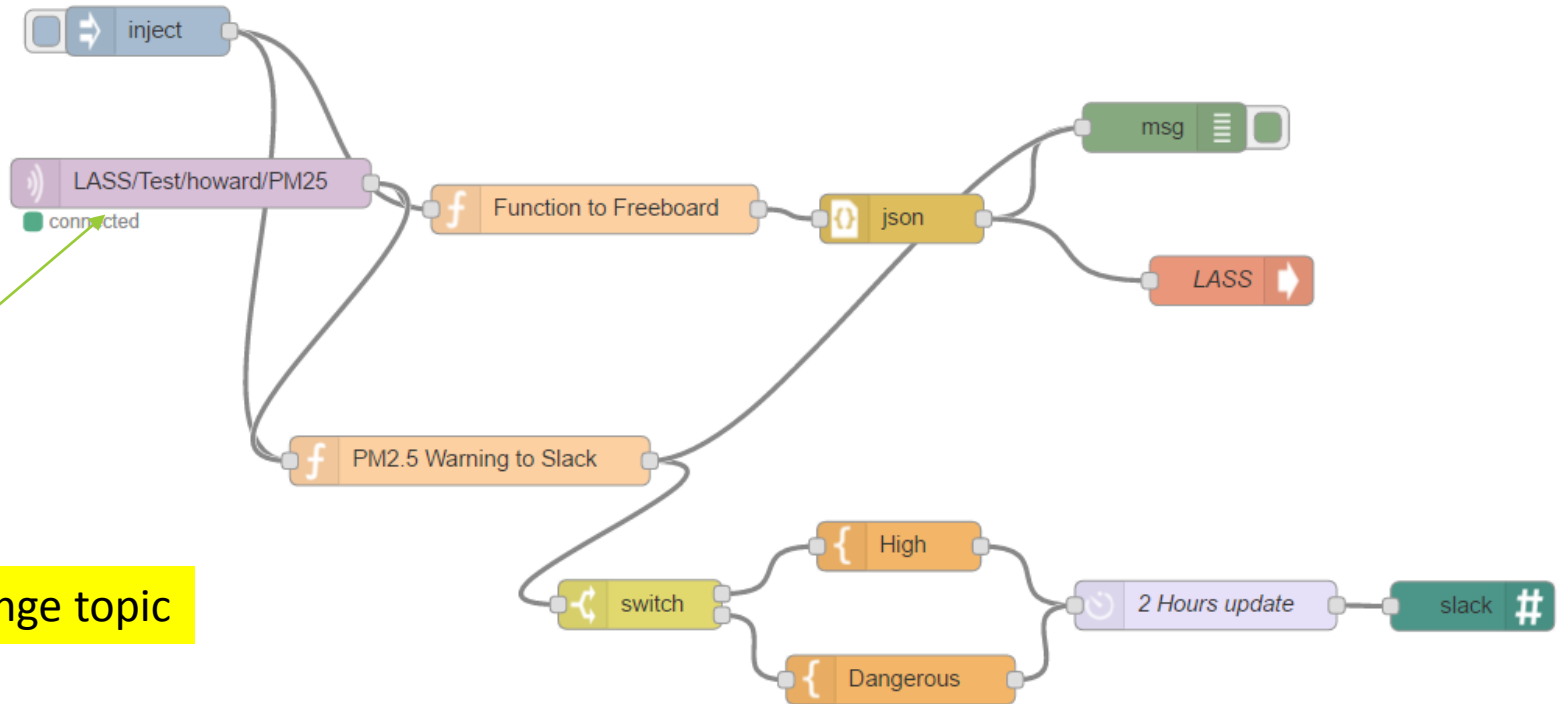
lver\_format=3|FAKE\_GPS=1|app=PM25|ver\_app=0.8.3

MQTT Companion channel published...

MQTT sending

LED:Wifi and gps ready!

1. Change topic



# Download Freeboard Template

---

On Github. Download Freeboard Json file, unzip, and upload

<https://github.com/howardweng/FLASS/tree/master/node-red-freeboard-json>

Deploy

freeboard

+

info

debug

board

json

msg

LASS

ch

High

Dangerous

2 Hours update

slack

Node

Name	LASS
Type	freeboard
ID	571a3fb2.cff638

► Properties

Using this node you can transmit i  
freeboard. Just send some JSON  
example using a function node) to  
receive them in freeboard.

Open your local **Freeboard** and ac  
that is named like the Freeboard N  
(see "name" below "Properties" in

freeboard

LOAD FREEBOARD

SAVE FREEBOARD

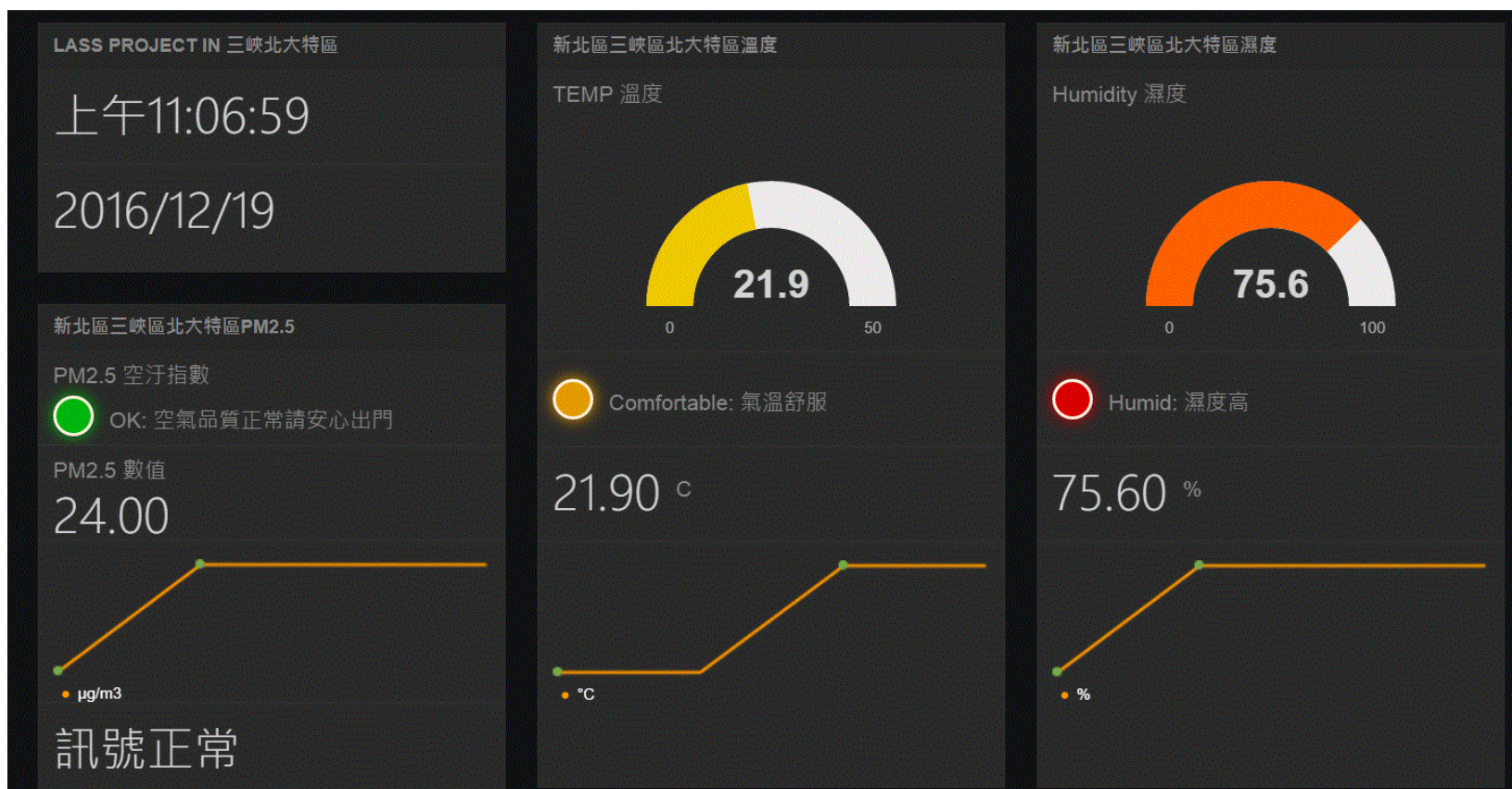
ADD PANE



# freeboard

[https://github.com/howardweng/FLASS/blob/master/node-red-freeboard-json/freeboard\\_howard\\_lass.zip](https://github.com/howardweng/FLASS/blob/master/node-red-freeboard-json/freeboard_howard_lass.zip)

Freeboard JSON for Node-RED. Please Download unzip





# Slack



# Goodbye



FRRUT



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**FRRUT.COM**

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