



QIoT + Sigfox

結合在海洋環境保護及漁業上
物聯網的應用

Outlines



介紹

- ◆ Sigfox
- ◆ QIoT Suite Lite
- ◆ 全球性競賽魚客松



影片分享

- ◆ 漁客松影片分享
- ◆ 來自台灣Sigfox的訊息 (影片分享)



來賓分享

- ◆ 潛艇勾吻鮭



動手做

- ◆ 動手連接QIoT Suite Lite和Sigfox



Sigfox &



QIoT

fishackathon



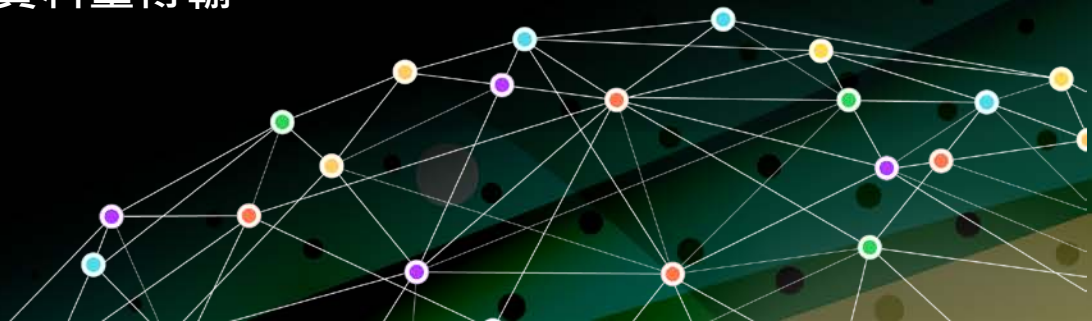
介紹

**sigfox**

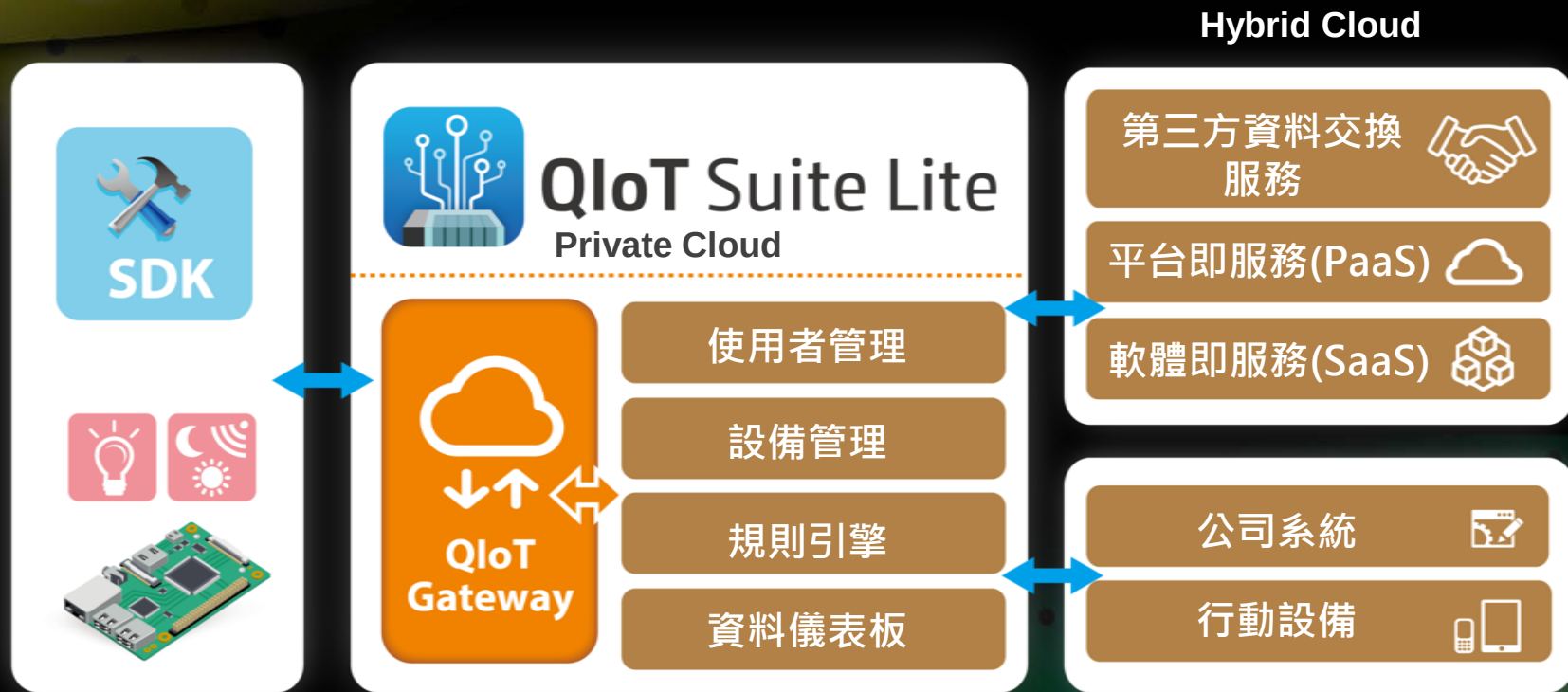
Make Things Come Alive

Sigfox為超窄頻通訊技術(Ultra Narrow Band)，主要使用免執照的Sub-Ghz ISM頻段，因此相較於需要授權金的行動電信業者的蜂巢通訊技術，省下了高額的授權費用。Sigfox可傳輸12Bytes以下的數據，也能透過網路定位裝置所在的位置。

- ◆ 來自法國的低功耗廣域網路 (Low Power Wide Area Network，簡稱LPWAN) 無線通訊技術
- ◆ 為開放式的IoT網路通訊協定 (蜂巢式, Cellular Style)，主要使用頻段為sub-1G"，特性為長距離，低資料量傳輸。
- ◆ 與電信業者(基地台)合作



QIoT Suite Lite 從私有雲至混合雲



魚客松

- 「魚客松」是由美國國務院與致力於在全世界建立科技社群的非營利組織HackerNest共同主持。
- 魚客松在包括台北和高雄等全球數十個城市同時舉行，邀請程式開發人員針對全球海洋、魚類、和漁業當今所面臨的問題，為之開發行動和技術工具。獲勝者可以在當地獲頒獎金並進入全球決賽，並有機會獲得全球大獎。

2018

fishackathon ><>

2018/2/3-2/4

魚客松

以海洋為主的黑客松

全國冠軍隊伍 Ocean Fox



全國冠軍隊伍 Ocean Fox



Ocean Fox 隊長



A portrait of a man with short dark hair and glasses, wearing a black t-shirt with the text "><> fishackathon" in white. He is standing against a white background. To his right is a grey panel with a yellow triangle at the top left corner.

QNAP®

賴桑小檔案

- 國內知名 Maker，活躍於Maker 社群及黑客松比賽
- 具電子電機背景，社群稱號賴桑
- 其所屬團隊 Ocean Fox 奪得 2018 年魚客松比賽台灣站冠軍
- 現為台北科技學電子工程研究所博士生
- Sigfox 台灣營運商 Unabiz 之顧問

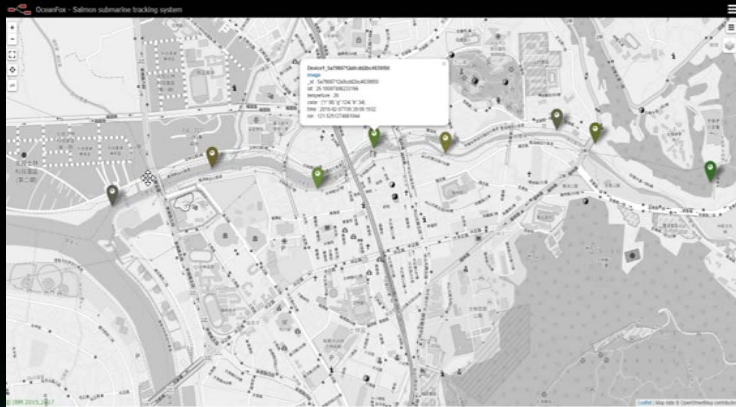


全國冠軍來分享

潛艇鉤吻鮭

Formosan salmon submarine sampling system

Ocean Fox



* 賴桑：說明作品名稱

現存問題及改善目的



淡水監測和通報系統

- ✓ 颱風過後死魚成群
- ✓ 電鍍廠架廢水處理不佳
- ✓ 河藻劇增，河川優氧化
- ✓ 農地排污規劃不善



保護河川，永續發展

- ✓ 給下一代一個好的環境

潛艇鉤吻鮭

迴遊特性

自河流上游出航，出海口自動回航

環境感測

含濁度、溫度、含氧、水壓等感測器

物聯網特性

Sigfox回傳資料至雲端儲存分析

河流取樣

開啟電磁閥，收集異常樣本帶回



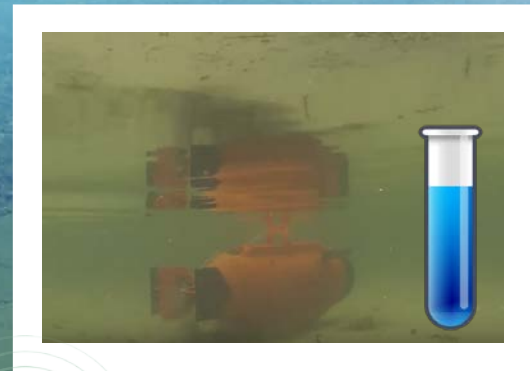


上游 投放潛艇鮭



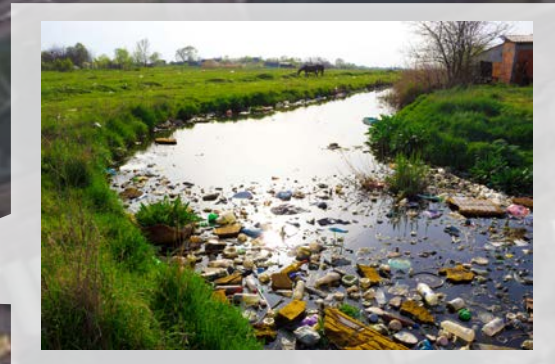
*以上資訊由魚客松參賽隊伍Ocean Fox提供

延途收集資料，異常水質取樣本 透過 Sigfox 回傳資料



*以上資訊由魚客松參賽隊伍Ocean Fox提供

集中監控及防止 非法排放污水

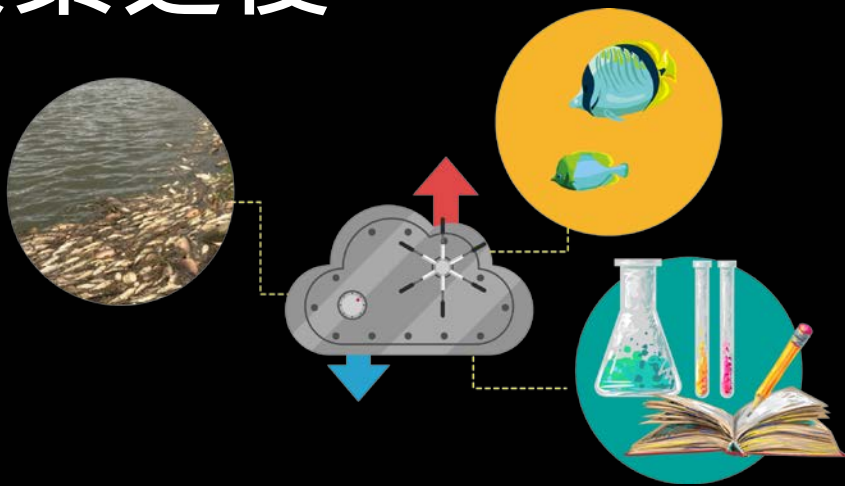


至出海口後，
自動導航回基地回收



*以上資訊由魚客松參賽隊伍Ocean Fox提供

資料收集之後



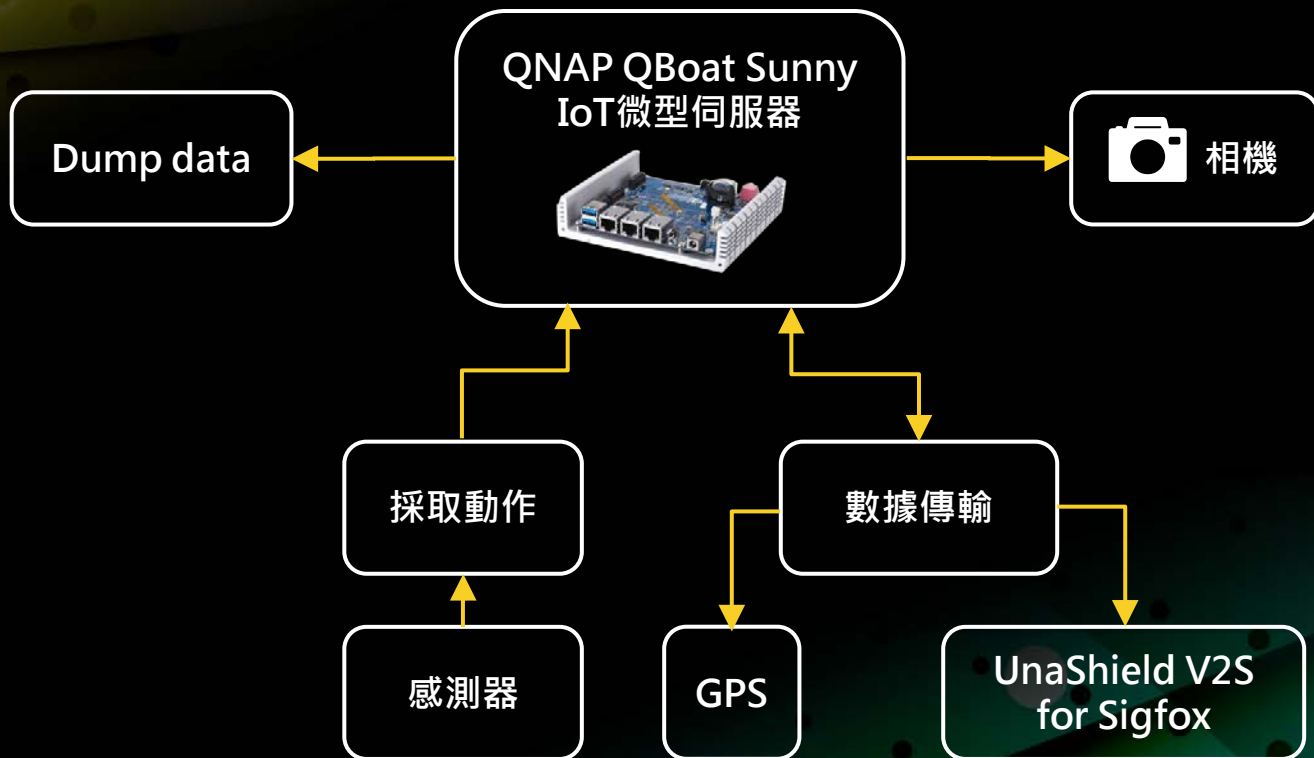
● 進階檢測水質

- ✓ 生化需氧量
- ✓ 藻類分析

● 水質歷史記錄

- ✓ 記錄樣品影像儲存在雲端
- ✓ 還原生物集體暴斃之環境條件
- ✓ 魚類影像分析記錄

系統框架(1/2)



系統框架 (2/2)

- 雷虎潛水艇

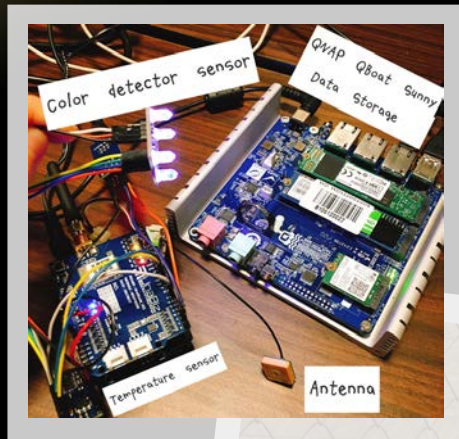
- ✓ Pixhawk 自動駕駛系統

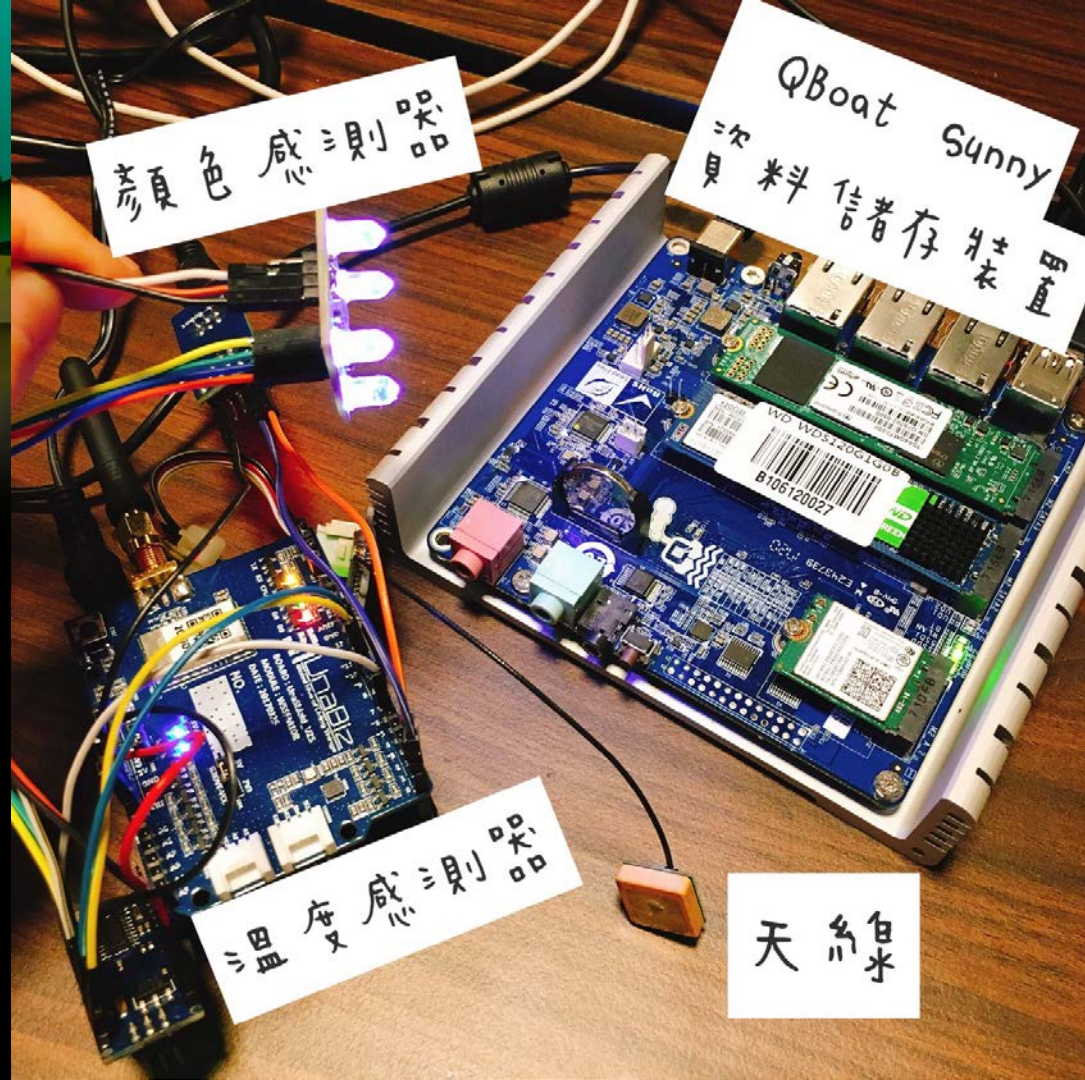
- 環境檢測插件

- ✓ Arduino、顏色感測器、溫度感測器

- 通訊技術與雲服務

- ✓ Sigfox & GPS
- ✓ QNAP QBoat Sunny (私有雲)
- ✓ Microsoft Azure (公有雲)





資料收集裝置

• 元件

- ✓ QNAP QBoat Sunny 作為控制中、資料儲存、及連線設備
- ✓ Arduino 作為感測器集線器
- ✓ 無線通訊透過UnaShield V2S for Sigfox

• 特點

- ✓ 容易使用
- ✓ 可擴充感測器

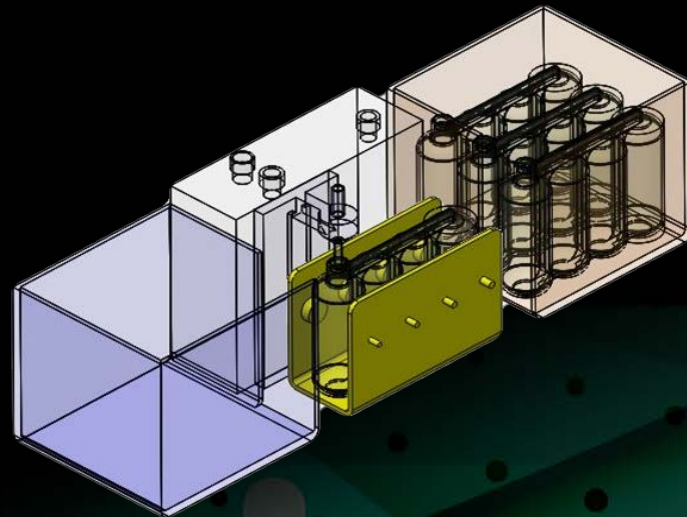
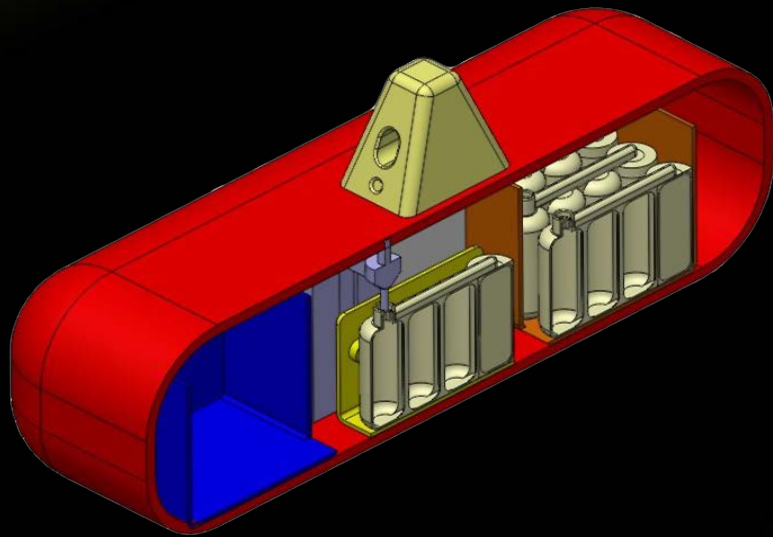
樣品分析

- 每一管10cc並滴入化學試劑，用於即時檢驗的現況，並搭配GPS、環境資訊上載到Sigfox網路；相同的資訊會也會被保留在QNAP QBoat Sunny中，待回實驗室後可透過區域網路複製出來，同時也將副本上傳至公有雲
- 備留取樣水回實驗室可繼續進行更精細分析

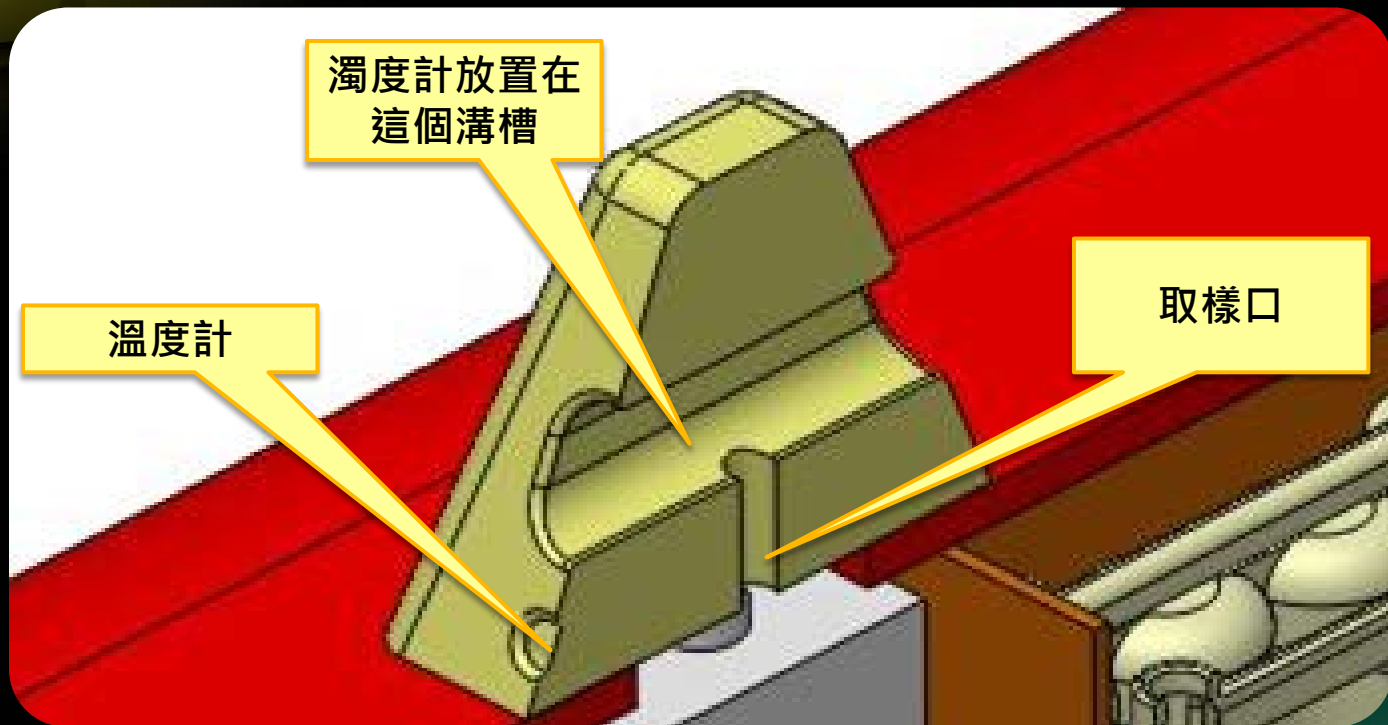


資料收集裝置3D圖 (2/1)

取樣機械剖面圖



資料收集裝置3D圖 (2/2)



實驗室後台樣本與管理

Sigfox

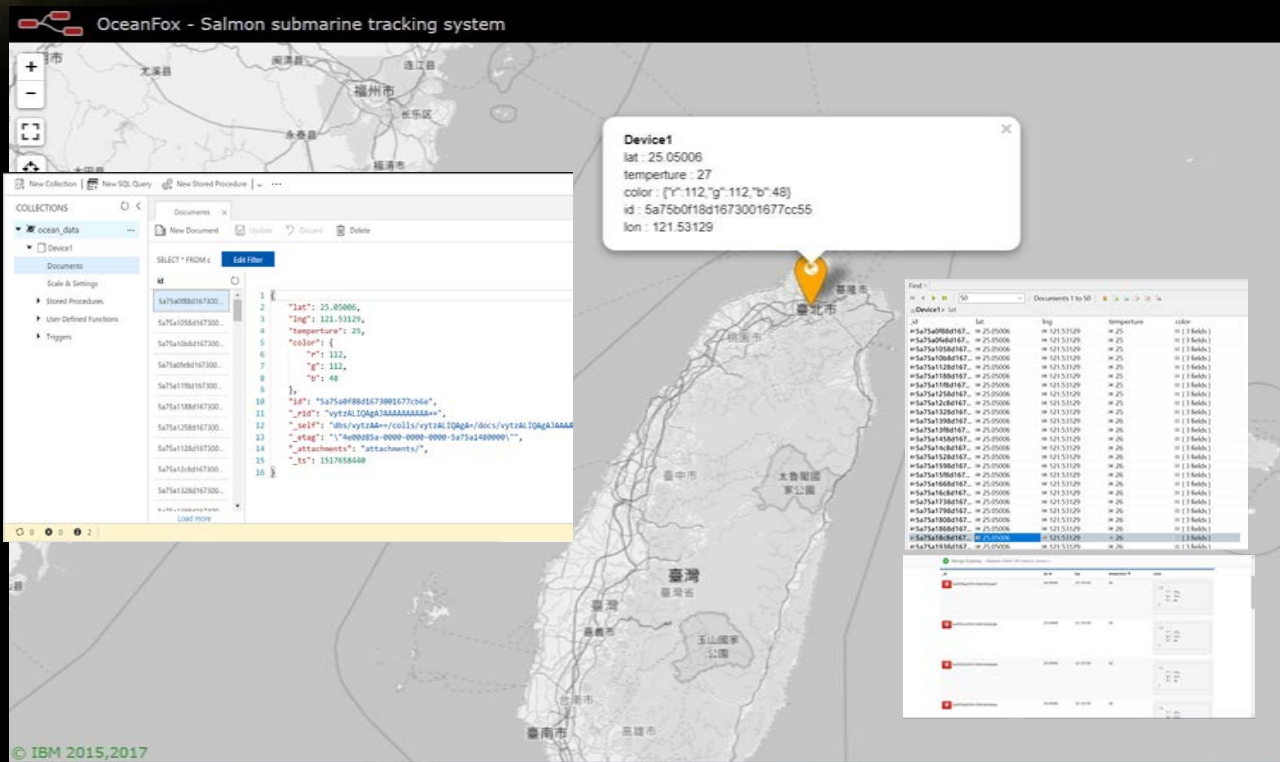
- 回傳即時資料

QNAP QBoat Sunny

- 存儲詳細取樣記錄

公有雲

- 大數據資料儲存
- 進階資料分析

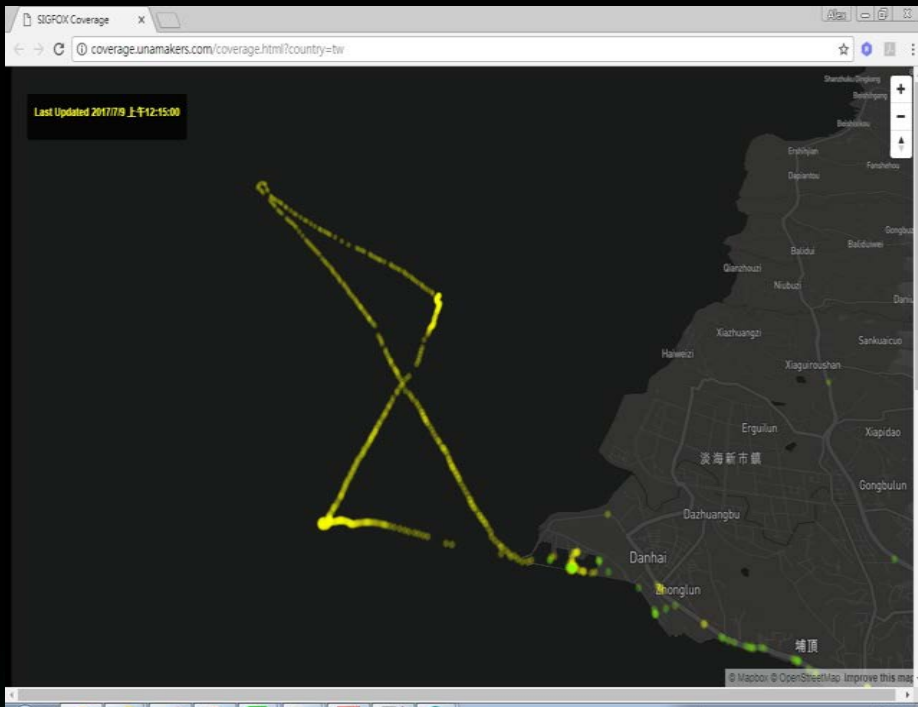


© IBM 2015, 2017

* 藉由Sigfox回傳並記錄於QBoat Sunny中的詳細取樣記錄，回到實驗室後結合Microsoft Azure的雲端服務，可以用瀏覽器就在畫面上呈現各個取樣點的資訊狀況

Sigfox 無線通訊傳輸

- 符合IEEE 802.11ah物聯網傳輸規格
 - 低功率消耗
 - 實測傳輸可達10km
- 無使用其他輔助裝置



* 20170807在台灣淡水出海實測，只利用手機行動電源，在沒有Repeater以及任何輔助強波裝置下，能達到10km的傳輸距離



影片分享

Fishakathon 海外參賽影片

來自Sigfox的訊息



動手連接

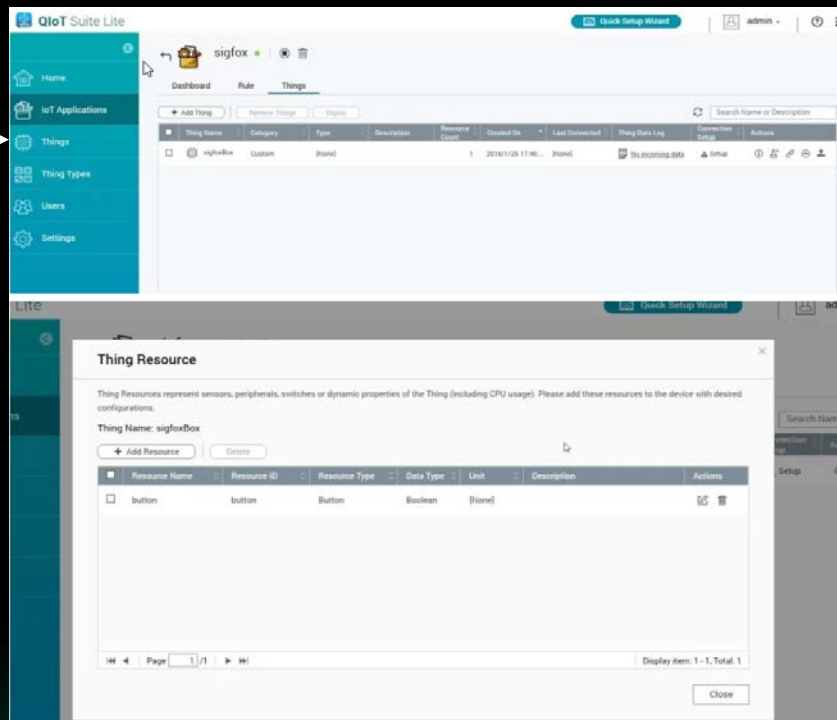
QIoT Suite Lite 和 Sigfox

Live Demo – QIoT 與 Sigfox

怎麼做連接

在QIoT Suite Lite上建立一個IoT Applaction、Things、Resource後，便可取得Resource HTTP以及HTTPS 的URL

至Sigfox網站開通Device以及註冊帳號後便可開始做連接啦！



登入sigfox

[Lost password](#)

Remember me for one week ☐

Sigfox首頁畫面



DEVICE DEVICE TYPE USER GROUP



NEWS

NETWORK EVENTS

SERVICE MAP

Welcome to
sigfox portal

Release 7.1

SIGFOX Cloud 7.1 release implements internal system improvement to enhance user experience and satisfaction. This release also contains the following:

DEVICE, MESSAGES AND CALLBACKS

[Tooltip for repeater](#)

In the device message tab, as a customer, I can now see the repeater contribution: number of frames received through repeater over the total number of frames received by the base station.

[DevKit flag](#)

In the Device information tab, a DevKit flag is added to the product certificate as a provisioning for future Activate platform.

[API messages documentation](#)

The OOB, Out Of Band, message description in the API devices messages section has been changed for more clarity. It is now described as set to true, the API returns OOB messages as well as all the repetitions. It is set to false by default.

[API check on device type name](#)

When using the create a device type API, a check is done on the device type name. It is no longer possible to create two device types with the same name under the same group.

15
FEBRUARY
2018

到Device Type分頁 → 點選‘New’

sigfox DEVICE DEVICE TYPE USER GROUP

Device type - List

Name Group

Include sub groups ☐ Display type

Count: 1 / 1 page 1

Description	Display type	Group	Keep alive	Name
UnaStar 1 Team 12 DeviceType	None	UnaStar 1 Team 12	N/A	US1T12 DeviceType

page 1

New

輸入相對應資訊 → 點選 'Ok'



DEVICE DEVICE TYPE USER GROUP



INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION

CALLBACKS

BULK OPERATIONS

Device type US1T12 DeviceType - Edition

Device type information

Name

Description

Keep-alive (in minutes)

Subscription automatic renewal ☒ ?

If we fail to call one of your callbacks, an email will be sent to the address below so that you can take action to fix the problem.

Alert email

Downlink data

Downlink mode

Expression must either include hexadecimal encoded bytes (ex: `deadbeefcafebabe`) or the following variables: - (time) 4 bytes - (tapId) 4 bytes - (rss) 2 bytes - (roaming) 1 byte

Downlink data in hexa ?

Payload display

Select below the most suitable parsing mode for the display of your payloads in the backend (mostly appropriate for debugging and development)

Payload parsing

Ok

Cancel

Ok

在側邊欄選擇CALLBACKS → 點選 'New'

 **sigfox**

DEVICE DEVICE TYPE USER GROUP

INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION

CALLBACKS

BULK OPERATIONS

Device type 'US1T12 DeviceType' - Callbacks

These callbacks transfer data received from the devices associated to this device type to your infrastructure. For more informations, please refer to the [Callback documentation](#)

DATA callbacks

Downlink	Enable	Channel	Subtype	Duplicate	Batch	Information	Edit	Errors	Delete
☒		UPLINK	☐	☐	[POST] https://32b6a910.ap.ngrok.io/resources/qiot/things/admin/sigfoxBox/button	  			

New

New

點選 'Custom callback'



DEVICE DEVICE TYPE USER GROUP



INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION

CALLBACKS

BULK OPERATIONS

Device type 'US1T12 DeviceType' - New Callback

Create callbacks to connect Sigfox cloud to your server/platform.

A callback is a custom http request containing your device(s) data, along with other variables, sent to a given server/platform when the aforesaid device(s) message is received by Sigfox cloud.



Custom callback

Creates a new callback from **Sigfox cloud to your own server**. This is the "default" callback type. You can create a full custom request (http method, content type, headers, etc).



AWS IoT

AWS IoT is a managed cloud platform that lets connected devices easily and securely interact with cloud applications and other devices. AWS IoT can support billions of devices and trillions of messages, and can process and route those messages to AWS endpoints and to other devices reliably and securely.



AWS Kinesis

Amazon Kinesis is a platform for streaming data on AWS, offering powerful services to make it easy to load and analyze streaming data, and also providing the ability for you to build custom streaming data applications for specialized needs.



Microsoft Azure™ Event hub

Event Hubs is an event processing service that provides event and telemetry ingress to the cloud at massive scale, with low latency and high reliability. This service is especially useful for: application instrumentation, user experience or workflow processing, Internet of Things (IoT) scenarios.



Microsoft Azure™ IoT hub

Azure IoT Hub is a fully managed service that enables reliable and secure communications between millions of IoT devices and a solution back end. Azure IoT Hub enables secure communications using per-device security credentials and access control. Note that the devices are **automatically created** on the IoT hub if needed.

輸入相對應資訊 → 點擊 'Ok'

 **sigfox**

DEVICE DEVICE TYPE USER GROUP

Online help

INFORMATION

LOCATION

ASSOCIATED DEVICES

DEVICES BEING REGISTERED

STATISTICS

EVENT CONFIGURATION

CALLBACKS

BULK OPERATIONS

Device type US1T12 DeviceType - Callback edition

Callbacks

Type **DATA** **UPLINK**

Channel **URL**

Send duplicate ☐

Custom payload config 

URL syntax: `http://host/path?id={device}&time={time}&key1={var1}&key2={var2}...`
Available variables: device, time, duplicate, snr, station, data, avgSnr, lat, lng, rssi, seqNumber
Custom variables:

Url pattern `https://32b6a910.ap.ngrok.io/resources/qiot/things/admin/sigfoxBox/button`

Use HTTP Method **POST**

Send SNI ☒ (Server Name Indication) for SSL/TLS connections

Access-Token

r.1836289dfb3f23989a2e59216cca54b2



RequesterId

d4952b4a-4ebe-40cf-8cd1-6f7376fb0cff



header

value

Content type **application/json**

Body

```
{
  "device" : "{device}",
  "data" : "{data}",
  "time" : "{time}",
  "snr" : {snr},
  "rssi" : {rssi},
  "station" : "{station}",
  "lat" : {lat},
  "lng" : {lng}
}
```

Ok

Cancel

設定完成後即可在QIoT Suite Lite 接收到Sigfox訊息

The screenshot displays the QIoT Suite Lite interface. On the left, a flow diagram shows a sequence of three nodes: a teal 'Sigfox_button' node with a 'connected' status indicator, a yellow 'move msg.payload.value' node, and a green 'msg.payload' node. On the right, the 'debug' tab is active, showing a log entry for '2018/1/24 下午6:41:13' with the ID '8ce2a518.b0c588'. The log entry shows 'msg.payload : Object' followed by a JSON object: { "device": [REDACTED], "data": "00", "time": "1516790470", "snr": 48.66, "rssi": -95, "station": [REDACTED], "lat": 25, "lng": 122 }.

```
graph TD; Sigfox_button[Sigfox_button] --> move_payload[move msg.payload.value]; move_payload --> msg_payload[msg.payload];
```

2018/1/24 下午6:41:13 8ce2a518.b0c588

msg.payload : Object

```
{ "device": [REDACTED], "data": "00", "time": "1516790470", "snr": 48.66, "rssi": -95, "station": [REDACTED], "lat": 25, "lng": 122 }
```

QIoT + Sigfox

是您最好的選擇