

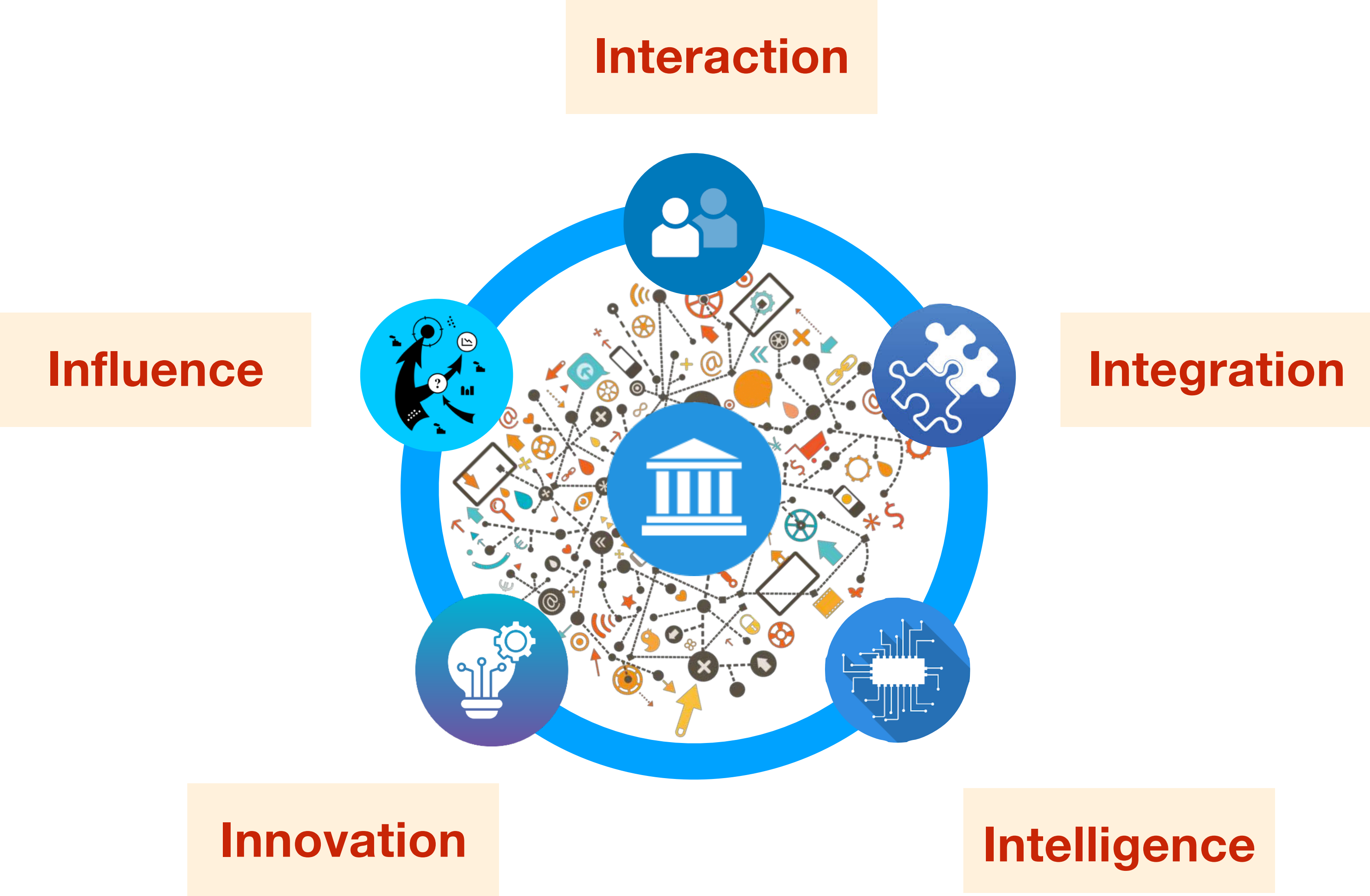
# Open Government Data for Better Public Services

Data-Driven Smart Governance

Open Data Alliance  
Dongpo Deng  
2024/03/26

**Can Open Government Data (OGD)  
be used to make better public  
services?**

# Data-Driven Smart Governance - the Five I

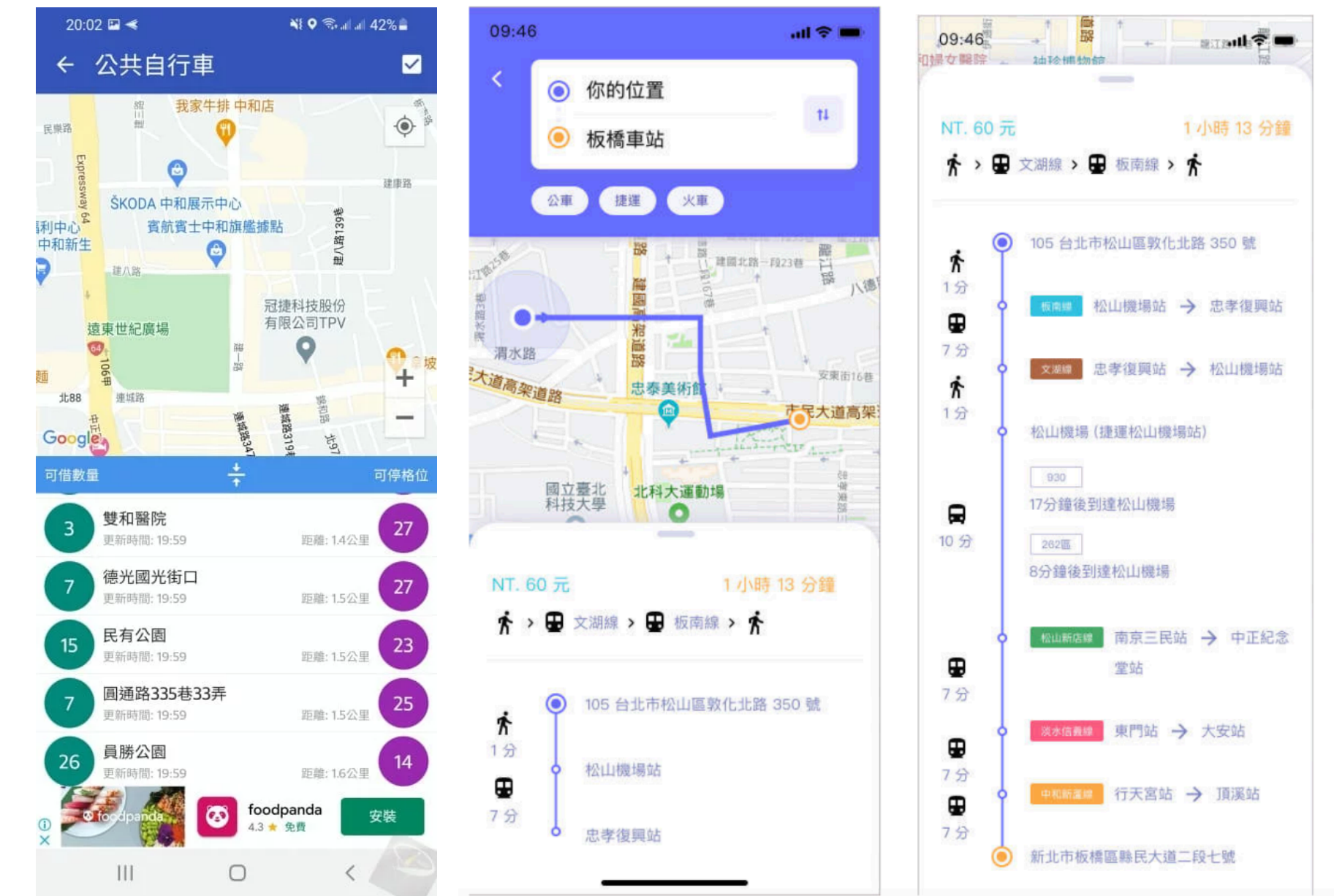




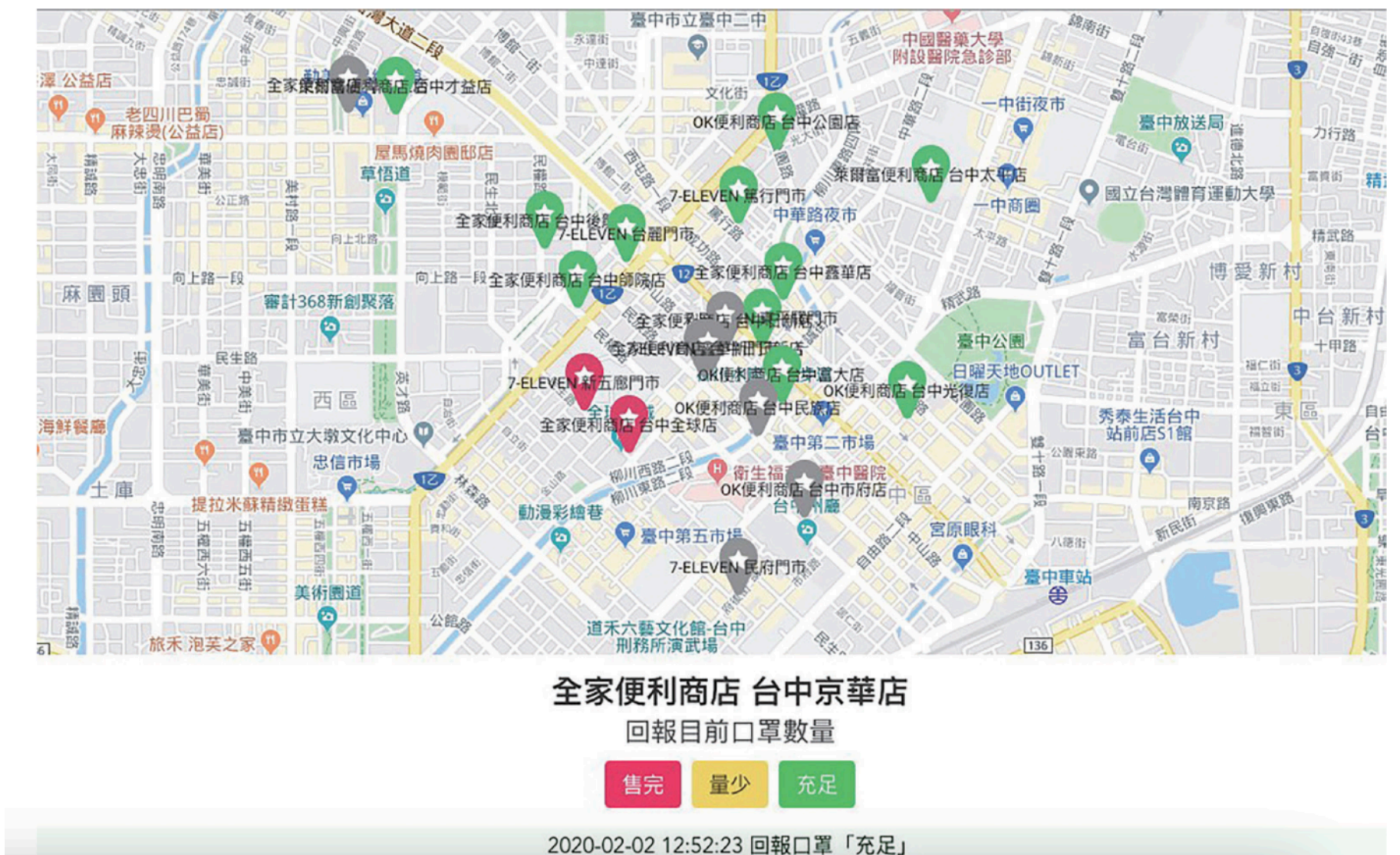
## Interaction

- Open Government Data (OGD) is a way allowing citizens to understand the affairs of governments. Also, the OGD provides citizens to improve the public services.
- Taipei City Gov. released the real-time bus tracking data. Citizens developed the **Bus Tracker Apps**. By their requirements
- Ministry of Health and Welfare Taiwan openly provided the daily amount of masks in each pharmacy. Citizens can made **Mask Maps** allowing to know where to get masks during COVID-19
- OGD offers citizens to brain-storming for better public services or problem solutions for citizens
- The brain storming activities, e.g. **Hackathon, Data jam, Datapalooza**

## Bus Tracker APP



## Mask Map

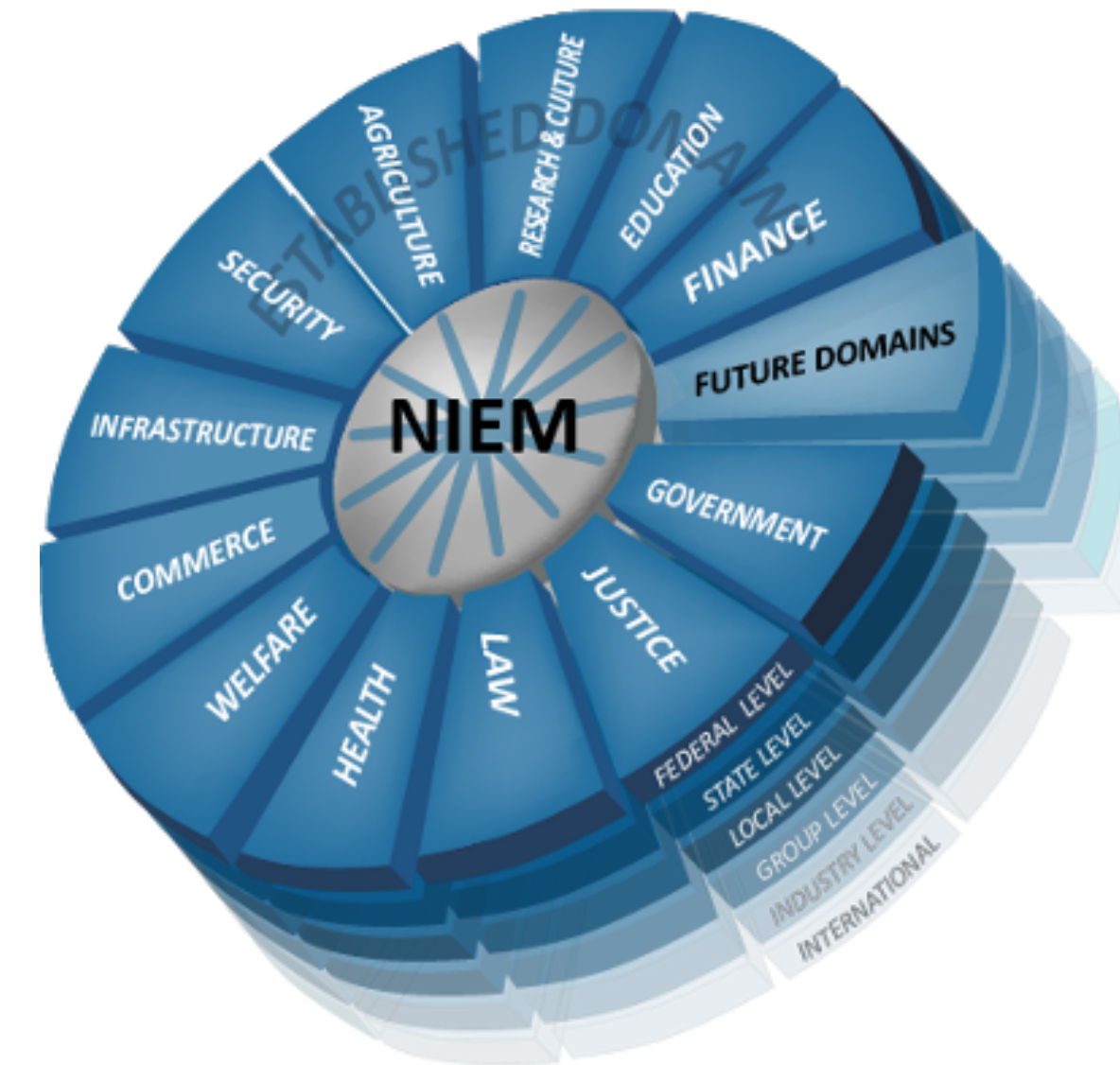




## Integration

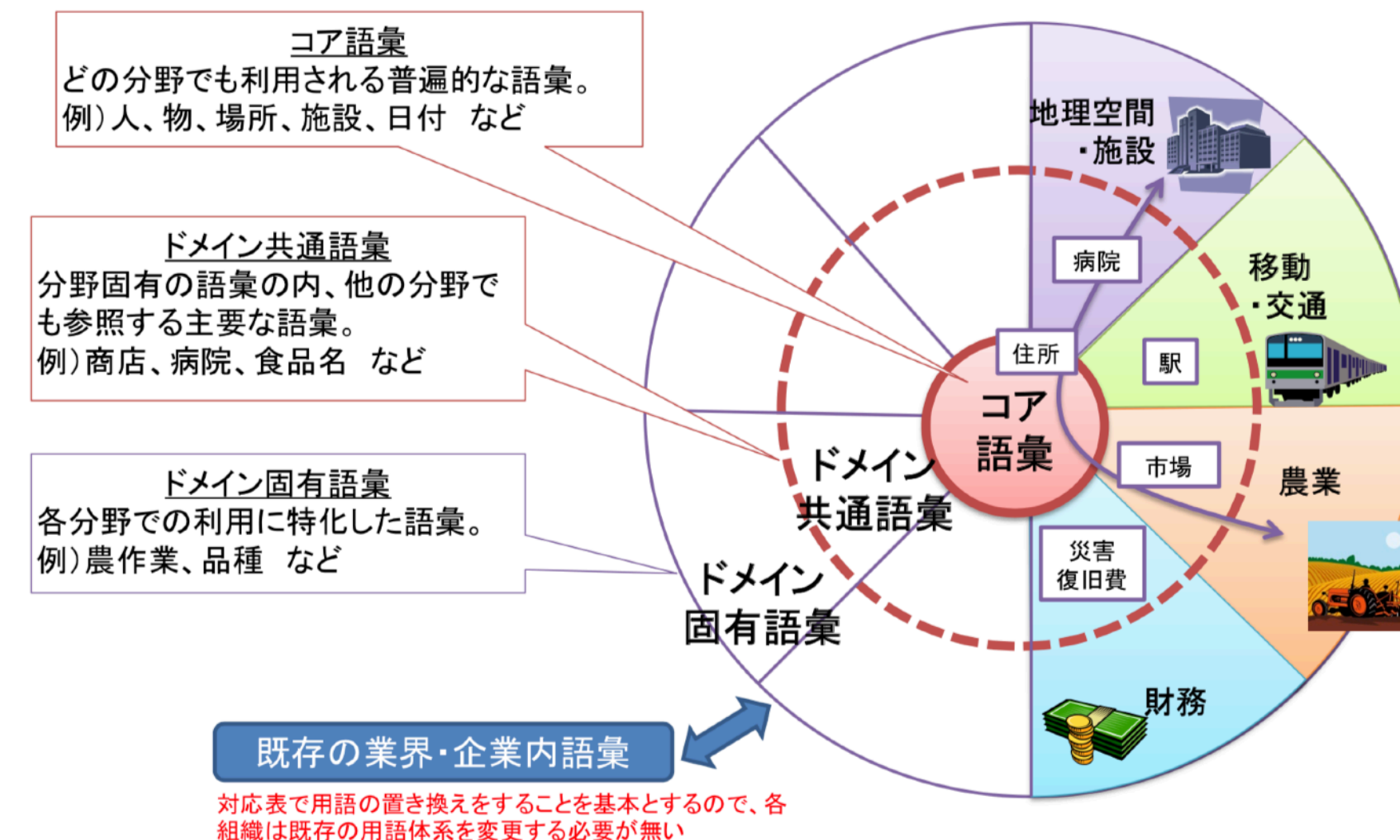
- To make better public services via using OGD, **data interoperability** is a crucial cornerstone
- The development of **common vocabularies** and **data standards** is a way to make OGD interoperability
- In Tim Berners-Lee's 5-stars Open Data, the top rank of open data is linked open data, which actually means the data interoperability.

## National Information Exchange Model (NIEM) in US



Picture source: <https://www.sparxsystems.com.au/domains/niem/national-information-exchange-model-niem-solution-with-enterprise-architect.html>

## Infrastructure for Multi-layer Interoperability (IMI)



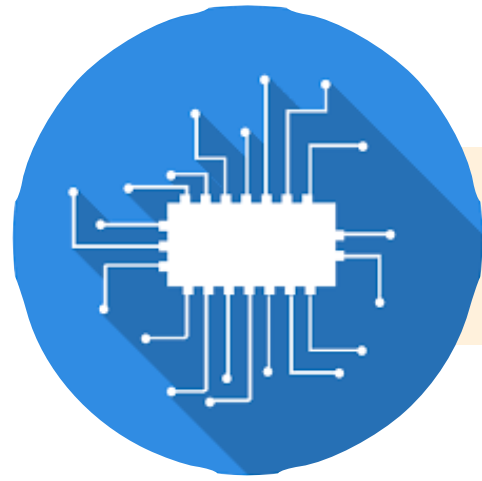
<https://imi.go.jp/goi/>



## Integration

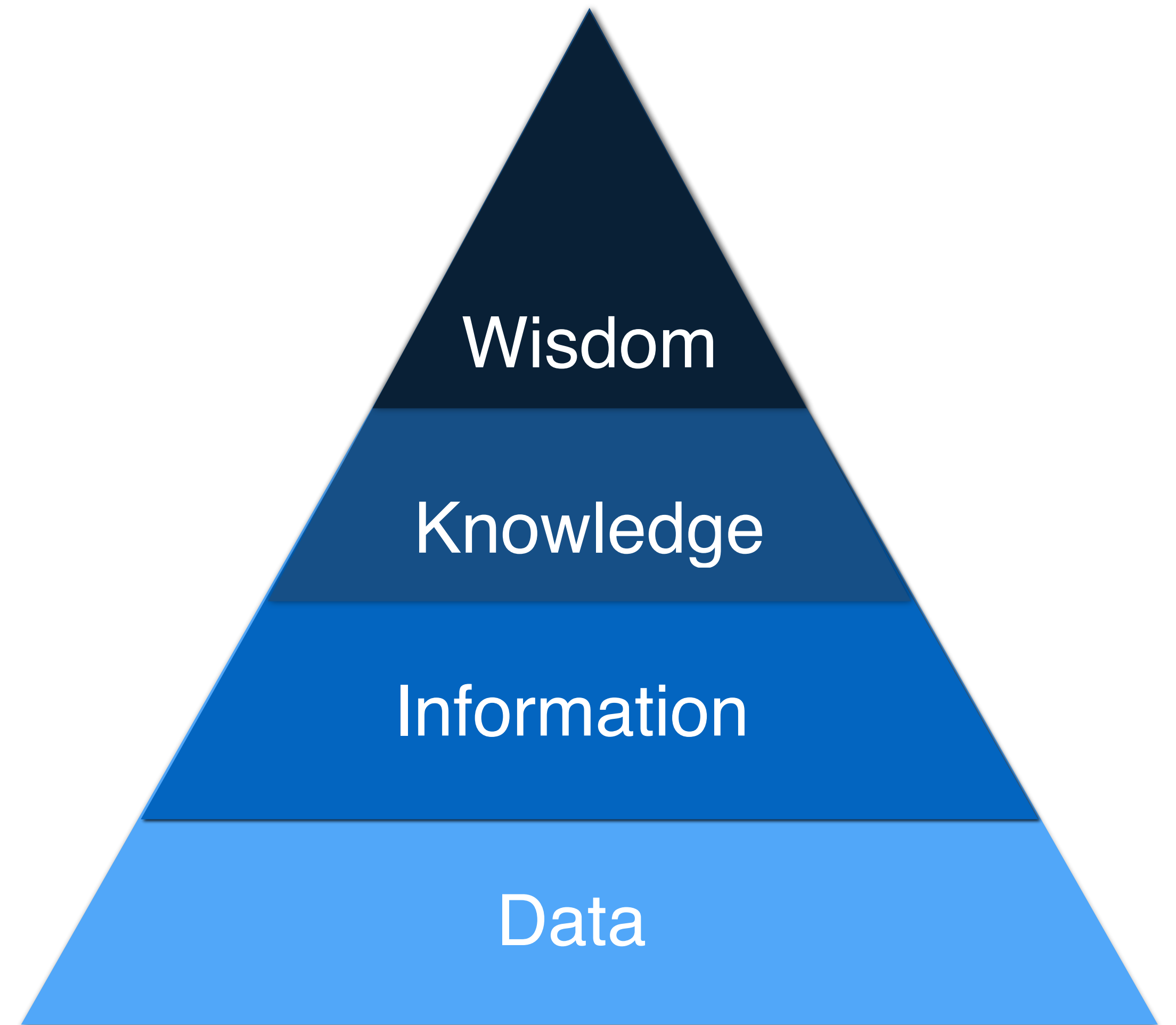
- To make better public services via using OGD, **data interoperability** is a crucial cornerstone
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- In Tim Berners-Lee's 5-stars Open Data, the top rank of open data is linked open data, which actually means the data interoperability.





## Intelligence

- Data is one of the sources for intelligence
- Public sectors applied **data science** for public good
  - Statistics Netherlands (CBS) is partnered with Vodafone for analyzing mobile call records. From the mobility patterns, they can make better traffic management and urban planning.
- The appearance of Chat-GTP revealed the coming of AI era. How to use generative AI for open data analysis to make better public services is imperative





# Innovation

- To match the demands from public sectors, for example,
  - Procurement Innovation Network, EU
  - The Open Regulation Platform, UK
- To match the demands from citizens,
  - Living Lab, using OGD for better quality of life

## Living Lab

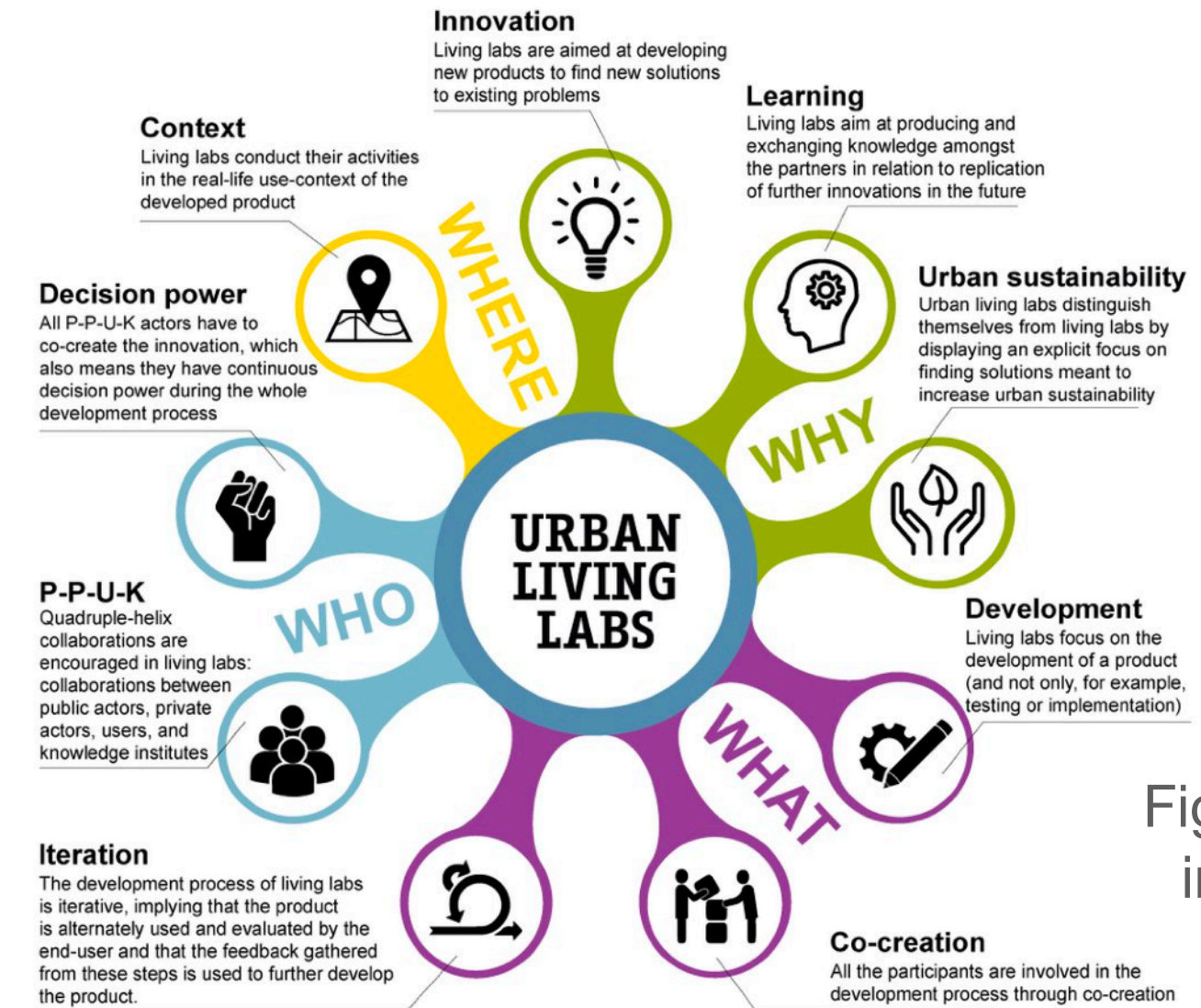
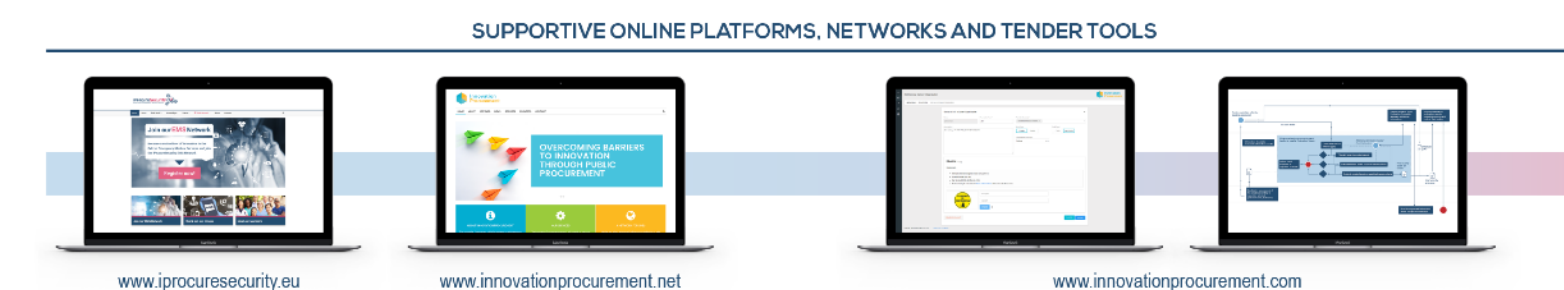
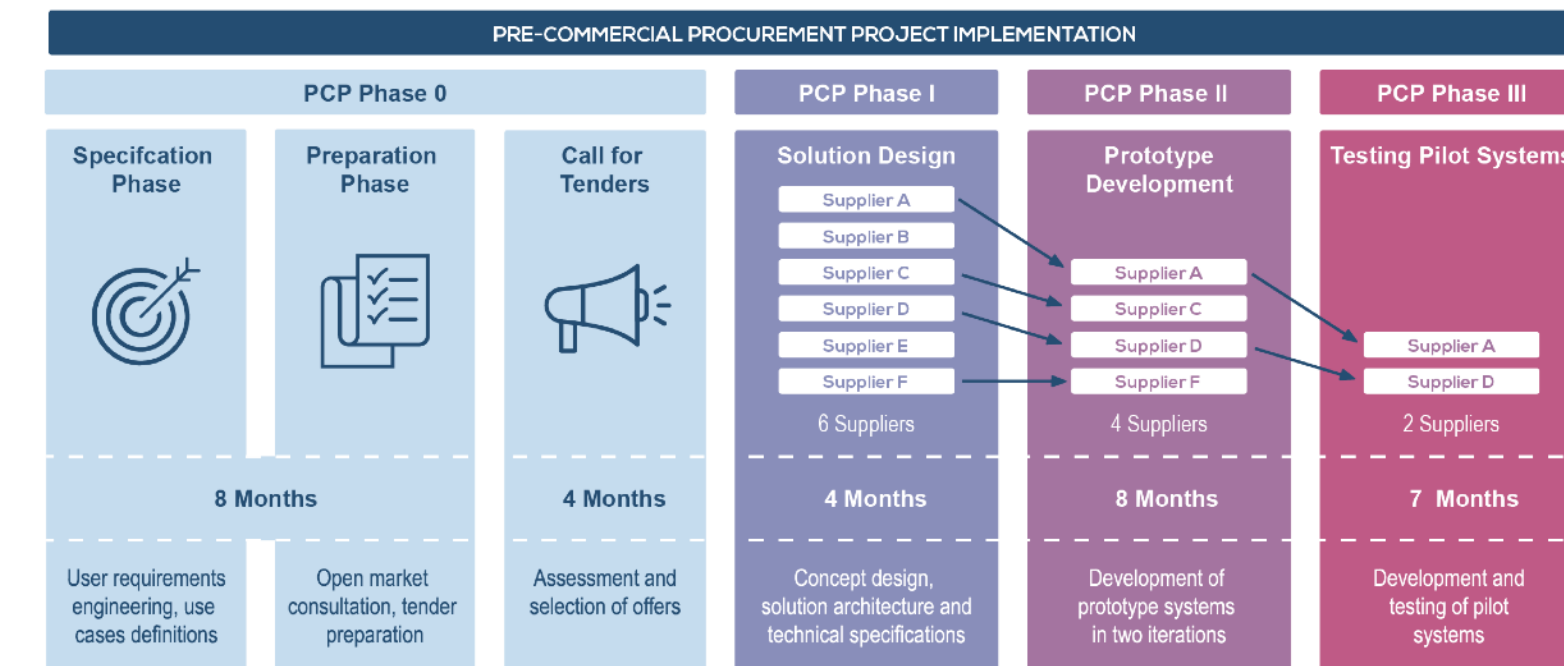


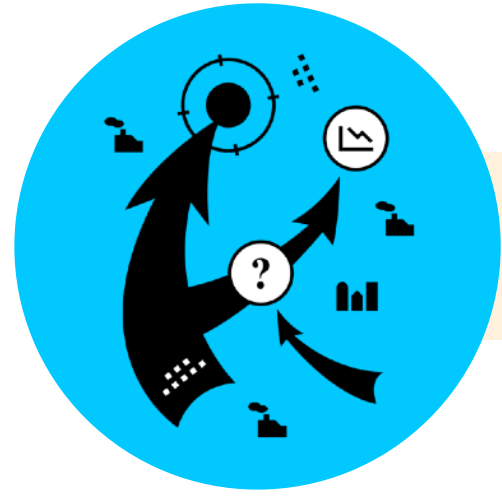
Figure from <https://www.ams-institute.org/how-we-work/living-labs/>

## The Innovation Procurement Network



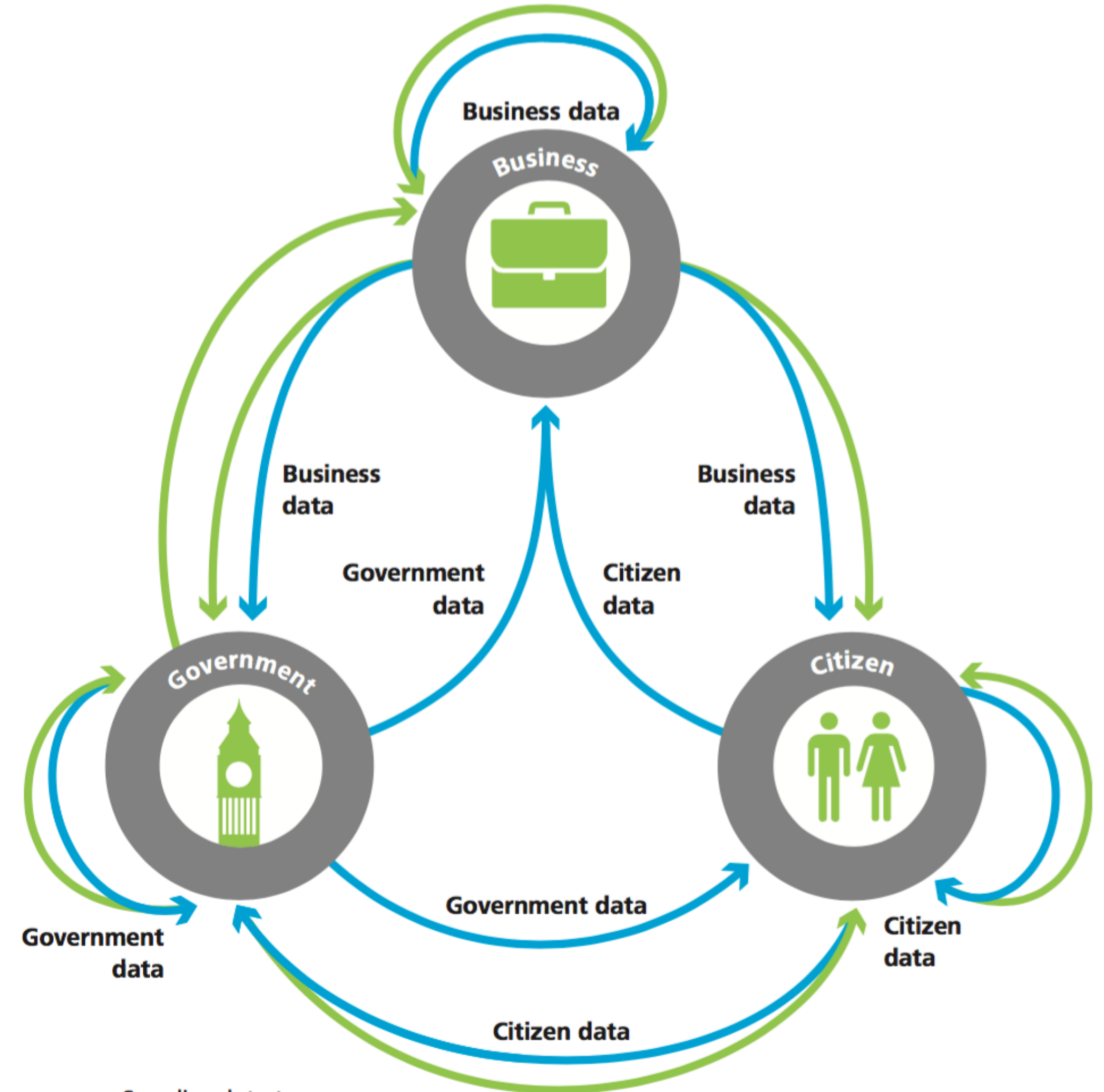
<https://pcp.iprocureresecurity.eu/>





## Influence

- To open more data in different domains, for example
  - NGO, open data for social good
  - Personal data, makes better public service experience (MyData policy, Taiwan)
- To change in terms of
  - Data governance
  - Decision culture
  - Data economic
- To make Public Private Partnership (PPP)



— Supplies data to  
— Uses data to deliver to

Source: Deloitte LLP

The case of  
Traceable Agriculture Product  
for better food choice

# Traceable Agriculture Product (TAP) dataset

## 產銷履歷資料

- Providing the agriculture product information to customers for building trust
- A rare dataset around the world
- High value dataset
- JSON format but data structure is tabular
- An good example why the data cannot present its value

政府資料開放平臺  
DATA.GOV.TW

網站導覽 | 登入 | 會員專區 | 線上客服 | 客服小幫手

資料集 | 高應用價值主題專區 | 資料故事館 | 互動專區 | 消息專區 | 諮詢小組 | 授權條款 | 關於平臺

資料集 / 產銷履歷

### 產銷履歷

資料提供包括：追蹤碼、農民經營業者、組織代碼、產品名稱、產地、生產者名稱、包裝日期、驗證機構、驗證有效日期、通路商資訊、詳細栽種流程、詳細履歷資料、詳細加工流程、其他驗證資訊、農產品產地地段地號、原料追溯碼網址、一籤一碼追溯碼等欄位資訊。

評分此資料集：  
☆☆☆☆☆  
平均 3.00 (12 人次投票)

訂閱

瀏覽次數: 18286 | 下載次數: 2175 | 意見數: 7

列印

<b>主要欄位說明</b> <small>*組體欄位為資料標準欄位</small>	Tracecode(追蹤碼)、Producer(農業經營業者)、OrgID(組織代碼)、ProductName(產品名稱)、Place(產地)、FarmerName(生產者名稱)、PackDate(包裝日期)、CertificationName(驗證機構)、ValidDate(驗證有效日期)、StoreInfo(通路商資訊)、OperationDetail(詳細栽種流程)、ResumeDetail(詳細履歷資料)、ProcessDetail(詳細加工流程)、CertificateDetail(其他驗證資訊)、LandSecNO(農產品產地地段地號)、ParentTraceCode(原料追溯碼網址)、Log_UpdateTime(資料更新時間)、TraceCodelist(一籤一碼追溯碼)
<b>資料資源下載網址</b>	<a href="#">JSON</a> 檢視資料 產銷履歷 <a href="#">CSV</a> 檢視資料 產銷履歷 <a href="#">XML</a> 檢視資料 產銷履歷

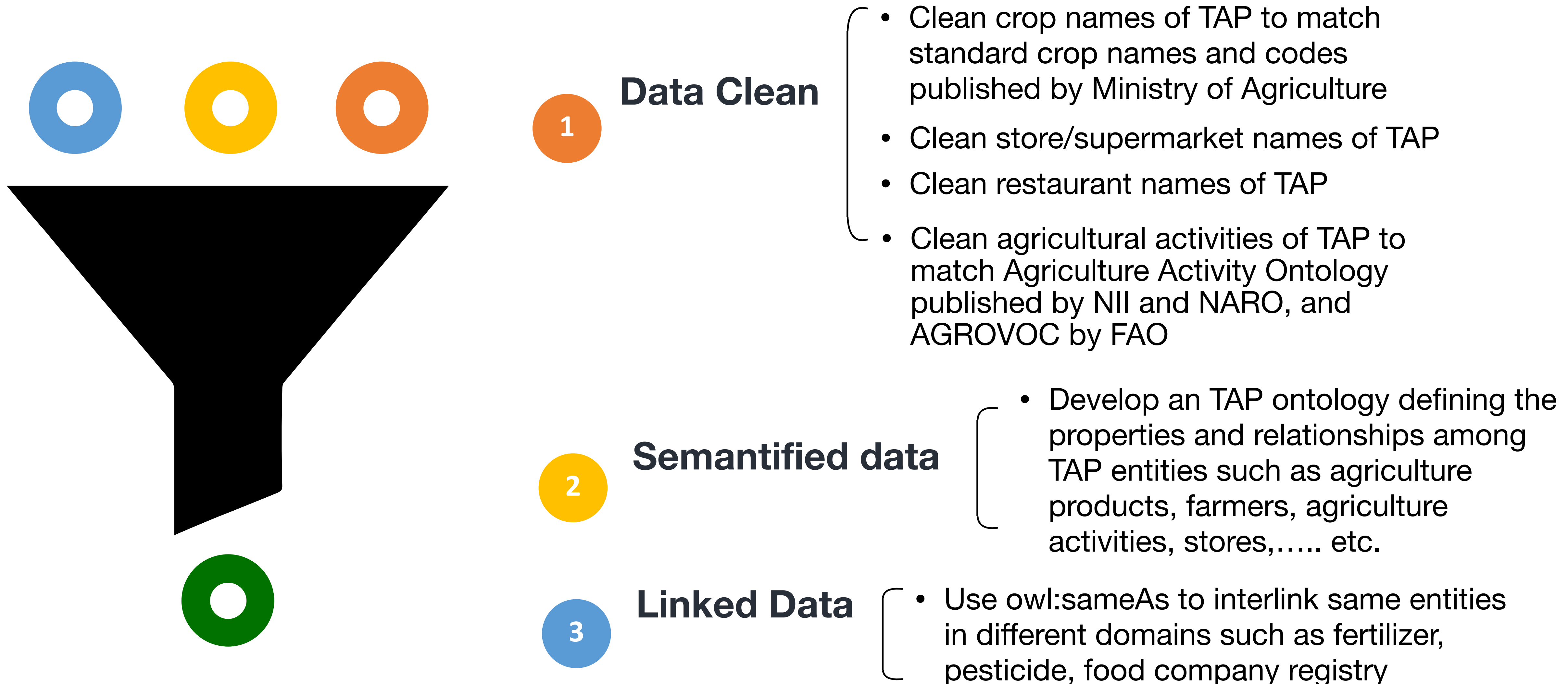
# Traceable Agriculture Product (TAP) dataset

## 產銷履歷資料

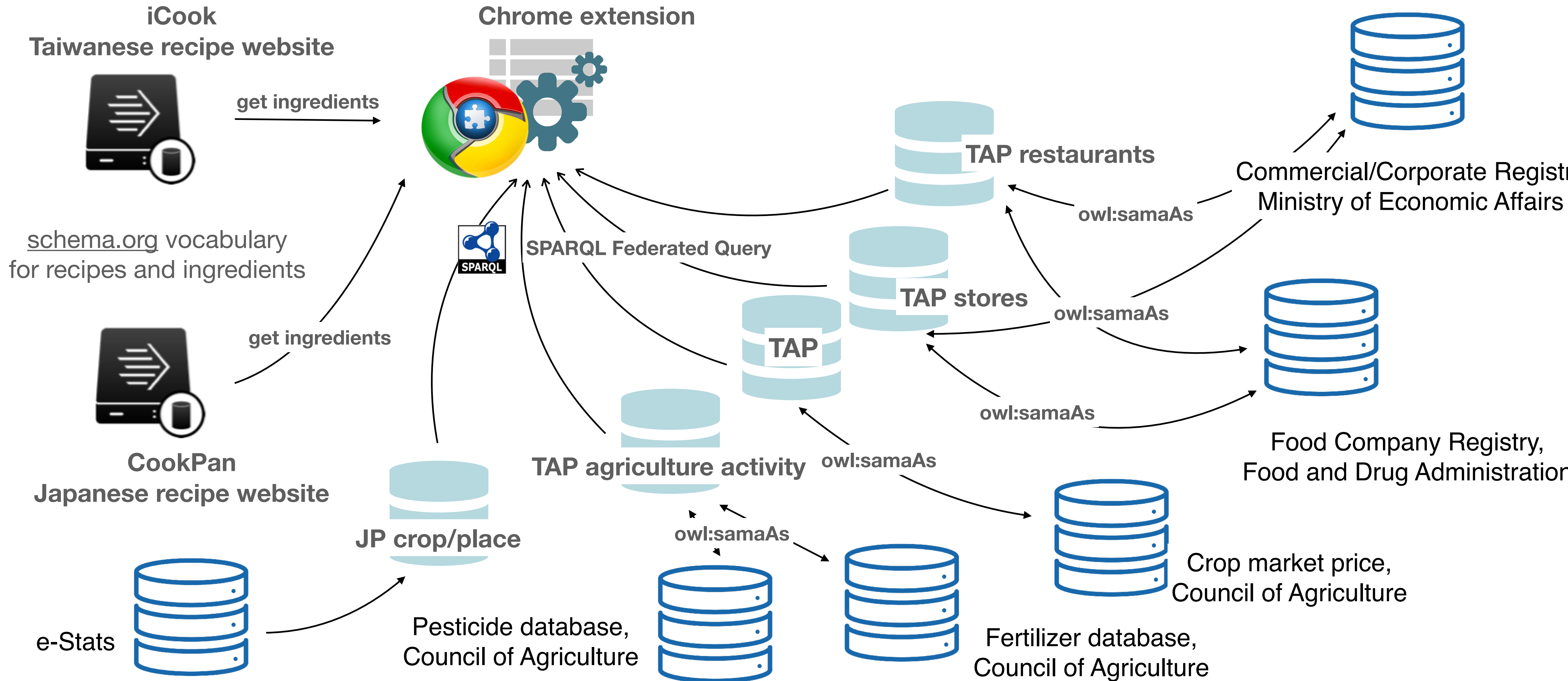
1. Product Name (產品名稱)
2. Organization ID (組織代碼)
3. Producer (農產品經營業者)
4. Place (產地)
5. Farmer Name (生產者姓名)
6. Pack date (包裝日期/出貨日期)
7. Certification Name (驗證單位)
8. Valid Date (驗證有效日期)
9. Store Information (通路商資訊)
10. Tracecode (追蹤碼)
11. Cadastral Number (農產品產地地段地號)
12. Parent trace code (原料追溯碼網址)
13. Trace code list (一籤一碼追溯碼)
14. Update time (更新時間)
15. Operation detail (詳細栽種流程)
16. Resume detail (詳細履歷資料)
17. Process detail (詳細加工流程)
18. Certificate detail (其他驗證資訊)

```
ProductName: "大蒜-蒜米(蒜米)",  
OrgID: "138090",  
Producer: "陳美玲",  
Place: "雲林縣四湖鄉東光段、雲林縣四湖鄉和平段、雲林縣四湖鄉保安段",  
FarmerName: "陳美玲",  
PackDate: "2017/09/15",  
CertificationName: "國立中興大學",  
ValidDate: "2020/04/19",  
StoreInfo: "",  
Tracecode: "02138090760777",  
LandSecNO: "",  
ParentTraceCode: "",  
TraceCodelist:  
"1060915013400008,1060915013400175,1060915013400271,1060915013400371",  
Log_UpdateTime: "2017/09/16",  
OperationDetail: "http://data.coa.gov.tw:80/Service/OpenData/Res",  
ResumeDetail: "http://data.coa.gov.tw:80/Service/OpenData/Res",  
ProcessDetail: "http://data.coa.gov.tw:80/Service/OpenData/Res",  
CertificateDetail: "http://data.coa.gov.tw:80/Service/OpenData/Res"
```

# Data Process of Traceable Agriculture Product



# Cross-sectional data integration for TAP queries



# LinkedFood: Chrome extension for recipe website

The screenshot shows a web browser displaying a recipe page on <https://icook.tw/recipes/228800>. The recipe is titled "台糖安心豚-蘿蔔玉米上湯". The page includes a search bar, a navigation menu, and a list of ingredients: 蘿蔔, 胡蘿蔔, 甜玉米, 糙米, 白米, 薑, 蔥, 蒜, 黑糖. A Chrome extension overlay is visible on the right side, displaying a list of ingredients and their corresponding traceability data. The extension also shows a table of data for the selected ingredient, including type, certificate details, operation details, and production information.

哪裡買	哪裡吃	哪裡產	推不推	看仔細
type		http://tap.linkedopendata.tw/TraceableAgriculturalProduct		
certificateDetail		http://data.coa.gov.tw:80/Service/OpenData/Resume/CertificateDetail_Plus/Tracecode=1060109020900007		
operationDetail		http://data.coa.gov.tw:80/Service/OpenData/Resume/OperationDetail_Plus/Tracecode=1060109020900007		
isProducedBy		穗穗企業有限公司		
processDetail		http://data.coa.gov.tw:80/Service/OpenData/Resume/ProcessDetail_Plus/Tracecode=1060109020900007		
isCertifiedBy		環球國際驗證股份有限公司		
referTo		http://tap.linkedopendata.tw/resource/Crop/蘿蔔		

# Across language: query Japanese crops

The screenshot shows the iCook.tw website interface. The main content area displays a recipe for "台糖安心豚-蘿蔔玉米上湯" (Taro Pork Bone Soup with Corn and Carrots). The recipe details include a serving size of 2 people and a cooking time of 30 minutes. The ingredients listed are 台糖安心豚龍骨 (Taro Pork Bone), 蘿蔔 (Carrot), and 玉米 (Corn). A map overlay on the right side of the page shows the location of the ingredients, with a callout for "富士吉田市" (Fujishiro City) in Yamanashi Prefecture, Japan. The map also shows other cities in the region, including 仙台市 (Sendai City), 東京 (Tokyo), 大阪 (Osaka), 福岡 (Fukuoka), and 鹿兒島 (Kagoshima).

愛料理首頁 | 生活誌 影音 市集 享樂誌 成為 VIP

Strata DATA CONFERENCE Turn algorithms into business advantage. Save 20% with code CF

台糖安心豚-蘿蔔玉米上湯

份量 2 人份  
烹調時間 30 分鐘

食材

- 台糖安心豚龍骨
- 蘿蔔
- 玉米

哪裡買 哪裡吃 哪裡產 推不推 看仔細

label 富士吉田市

Leaflet

特選推薦 贊助



# Query Japanese crops on JP website

COOKPAD Inc. [JP] | https://cookpad.com/recipe/4809685

← クックパッド | サービス一覧

毎日の料理を楽しみに **cookpad** 278万レシピ

大根 目的・用途 レシピ検索

お弁当 おにぎらず サンドイッチ キャラ弁 りんご

### 大根と鶏肉の煮物

レシピを保存

大根と鶏肉があればすぐにできます♪  
翌日温めなおしても味が染み込んでおいしいです。

 [あやみくん](#)

#### 材料

大根	小1本
鶏もも肉	1枚
砂糖	大さじ2
水	ひたひた(600ccくらい)
醤油	大さじ1
麵つゆ三倍濃縮	大さじ1

- 大根を1~1.5cmの  
いちょう切り、鶏  
もも肉を一口大に  
切る。
- フライパンに1を入  
れ、1がひたひたに  
なるくらい水を入  
れ、砂糖大さじ2を  
入れ10分ほど灰汁
- 残りの調味料をす  
べて加えて、大根が  
柔らかくなるまで  
15分ほど中火で煮  
込む。
- 大根がお好みの柔  
らかさになったら  
出来上がり♪

食材  
大根  
胡蘿蔔  
牛肉  
猪肉  
白肉雞  
牛肉精  
肉鴨

履歴  
1060223066500009  
1060108030800070  
10602210360  
1060121061200004  
1060125056200032  
1060111084600003  
10601060401

哪裡買 哪裡吃 哪裡產 推不推 看仔細



大根使い切り♪絶品レシピ

冷めても美味しい!あ  
ざりと大根の炒め煮  
bv. ちーゆづアーちゃん☆

# Query Taiwanese shops on JP recipe web

COOKPAD Inc. [JP] | https://cookpad.com/recipe/4809685

クックパッド | サービス一覧

毎日の料理を楽しみに **cookpad** 278万 レシピ

大根

お弁当 おにぎらず サンドイッチ キャラ弁 りんご

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込む。
- 大根がお好みの柔  
らかさになったら  
出来上がり♪

食材  
蘿蔔  
胡蘿蔔  
牛肉  
猪肉  
白肉雞  
生肉精  
肉鴨

履歴  
1060223066500009  
1060108030800070  
10602210360  
1060121061200004  
1060125056200032  
1060111084600003  
10601060401

哪裡買 哪裡吃 哪裡產 推不推 看仔細

頂好東光  
hasAddress 台北市中山區林森北路413號B1  
sell 油菜、蘿蔔、蘿美心、大蒜、小黃瓜、大陸A菜、蘿蔓、猪肉

大根使い切り♪絶品レシピ

冷めても美味しい!あ  
さり大根の炒め煮  
by ちーゆづアーちゃん☆

# Query Taiwanese restaurants on JP recipe web

The screenshot shows the Cookpad website interface. At the top, the browser address bar displays 'COOKPAD Inc. [JP] | https://cookpad.com/recipe/4809685'. The page header includes the Cookpad logo and navigation links. A search bar contains the text '大根' (Radish). Below the search bar, there are tabs for '哪裡買' (Where to buy), '哪裡吃' (Where to eat), '哪裡產' (Where produced), '推不推' (Recommend or not), and '看仔細' (View details). The 'Where to eat' tab is active, showing a map of Taipei with several purple location pins. A pop-up window on the map displays the following information:

- label: 西堤牛排 TASTY-台北復興南店
- hasAddress: 台北市大安區復興南路一段152號3樓
- dishName: 湯\_綠花椰巧達濃湯、素主餐\_三杯猴頭菇多穀飯、沙拉\_洋芋沙拉、主餐\_酥烤起司鱈魚

The main content area features a recipe for '大根と鶏肉の煮物'. It includes a photo of the dish, a description, a list of ingredients, and four numbered steps for preparation.

**大根と鶏肉の煮物**

大根と鶏肉があればすぐにできます♪  
翌日温めなおしても味が染みているおいしいです。

あやみくん

**材料**

大根	小1本
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水	ひたひた(600ccくらい)
醤油	大さじ1
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- 1 大根を1~1.5cmの  
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べて加えて、大根が  
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15分ほど中火で煮  
込む。
- 4 大根がお好みの柔  
らかさになったら  
出来上がり♪

大根使い切り♪絶品レシピ

冷めても美味しい!あ  
さり大根の炒め煮  
by ちーゆブアーちゃん☆

# Demo

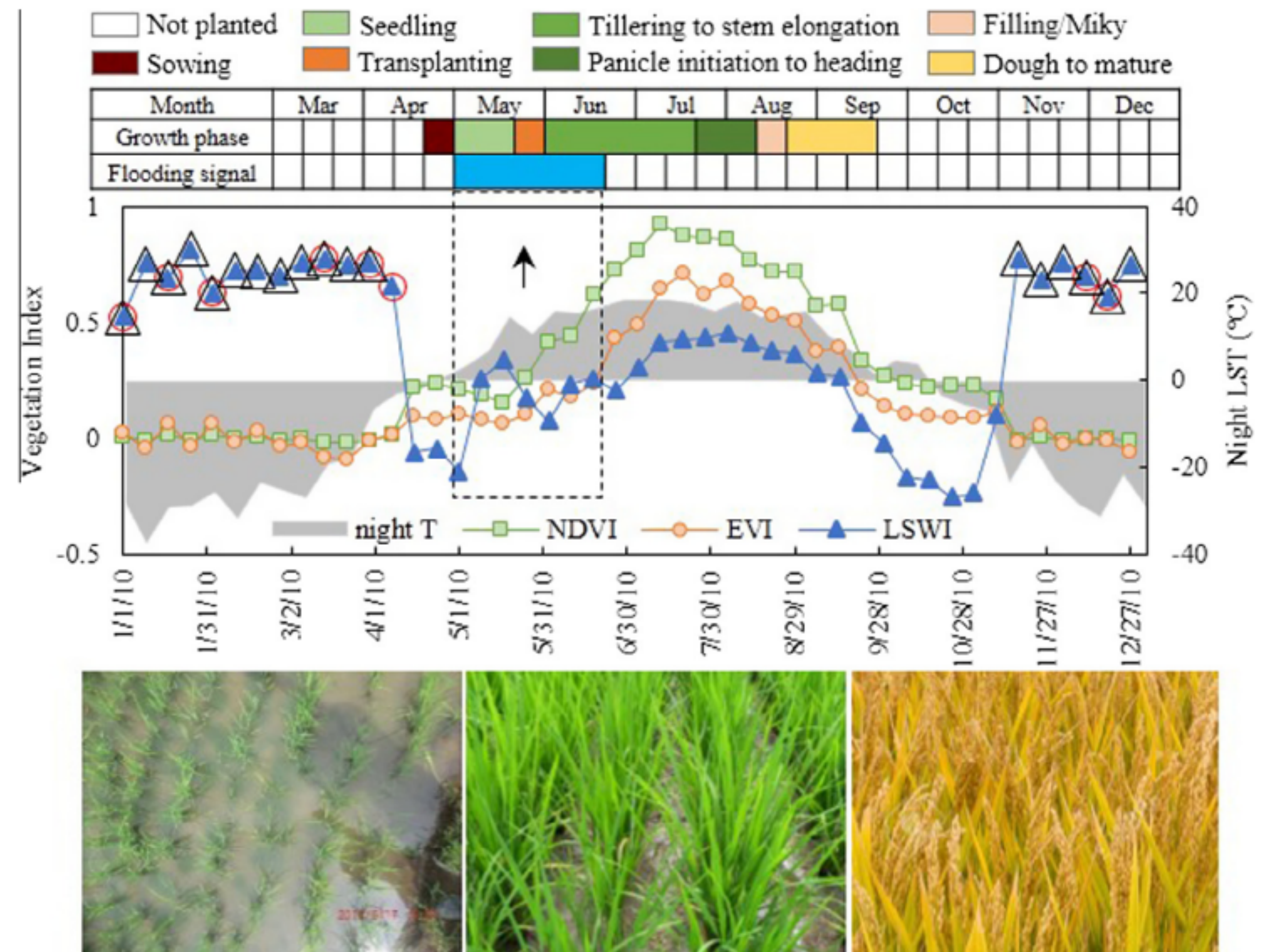
<https://www.youtube.com/watch?v=XytMotQwbA4&t>

The screenshot shows the iCook website interface. At the top, there's a navigation bar with links like '愛料理首頁', '生活誌', '影音', '市集', '享樂誌', and '成為VIP'. Below this is a search bar with the text '搜尋食譜名' and '搜尋食材, 以空格分開'. The main content area features a large featured recipe for '動手玩烘焙! 人氣手工餅乾跟著做' with an image of chocolate cookies. To the right, there are several recommendation cards for various recipes and products, such as '粽子吃不完? 簡單變身美味海苔捲!' and '一碗搞定! 人氣丼飯輕鬆做'. At the bottom, there's a section for '美味又健康的豆腐料理' with images of different tofu dishes. A video player at the bottom shows a video titled '白菜豆腐煲' with a duration of 00:00:01. A text overlay at the bottom of the video player reads '首先連上 iCook, 並搜尋番茄炒蛋的食譜'.

# Dynamic Cultivation Calendar

## 動態栽培曆

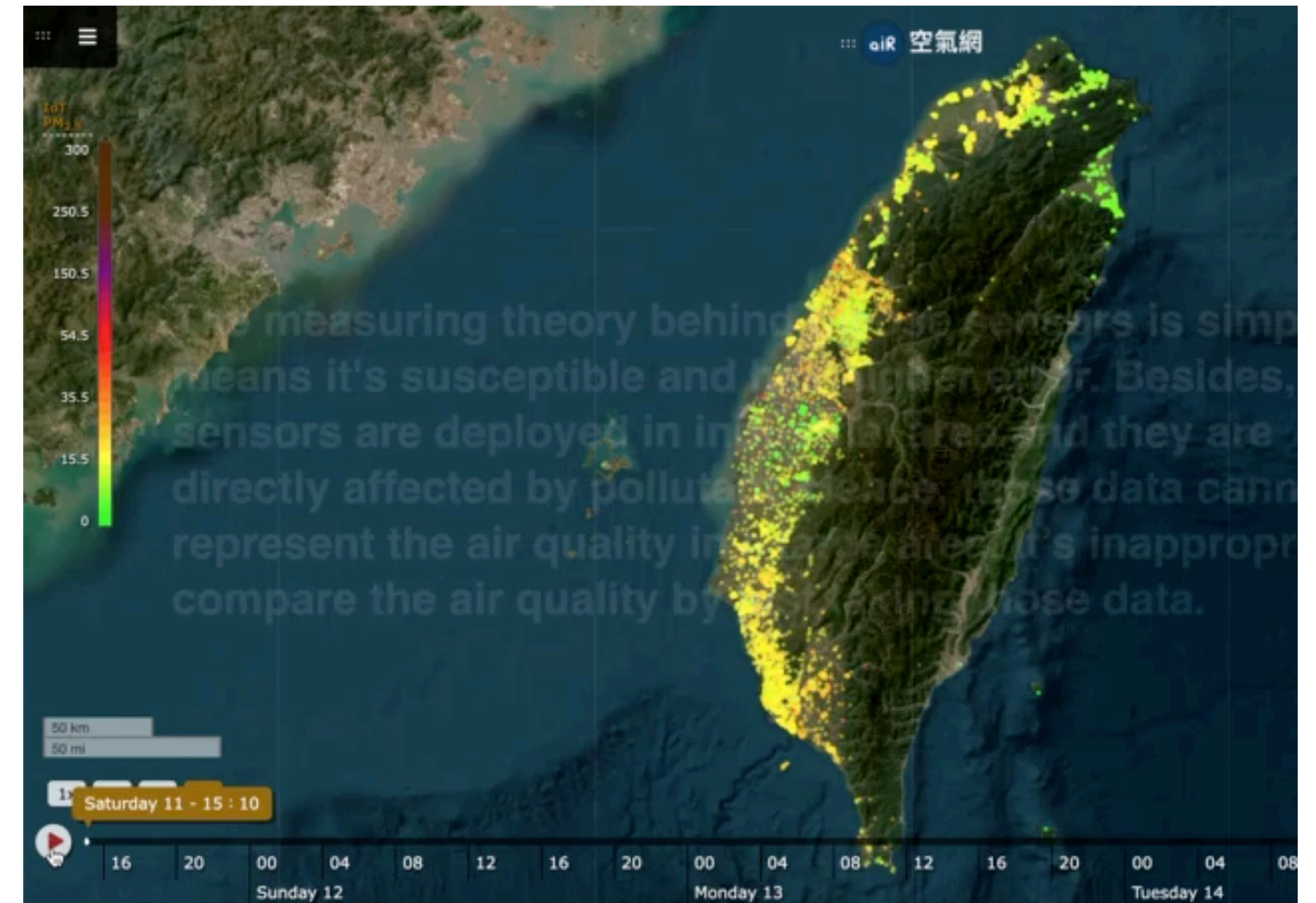
- Use paddy rice as an example
  - Cultivation calendar is mainly the relationship of temperature and water in the growth of paddy rice.
  - Cultivation calendar offers the timings to fertilization, watering, pesticide,...etc.
- The relationships of temperature and water can be observed via using IoT technologies
- The timing of agriculture activities could be extracted from traceable agriculture product datasets.



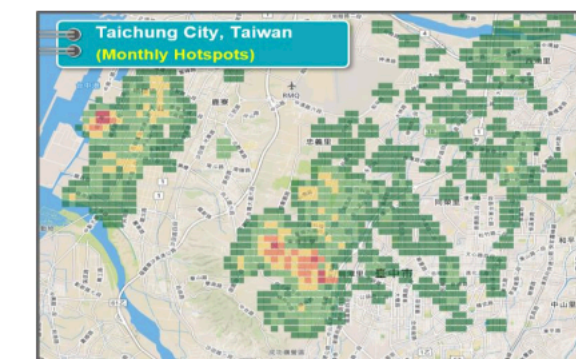
**Case of Integration of Civil IoT (Air quality)  
and open data for better quality of life**

# Air Quality Micro-Stations in Taiwan

- Started at civic technologies
  - People would like to know air quality surrounding area
  - Airbox developed by LASS (Location-Aware Sensing System)
  - Much cheaper than the national air quality stations, but not so precise
- EPA incorporated with private sectors to develop micro air quality sensors
- More precisely detect air pollution sources and track
- Make machine learning enable to be applied



- Find out the most frequently high pollution area



City level hot zone  
-- Which area is high polluted



Street level hot zone  
-- Which factory is suspicious



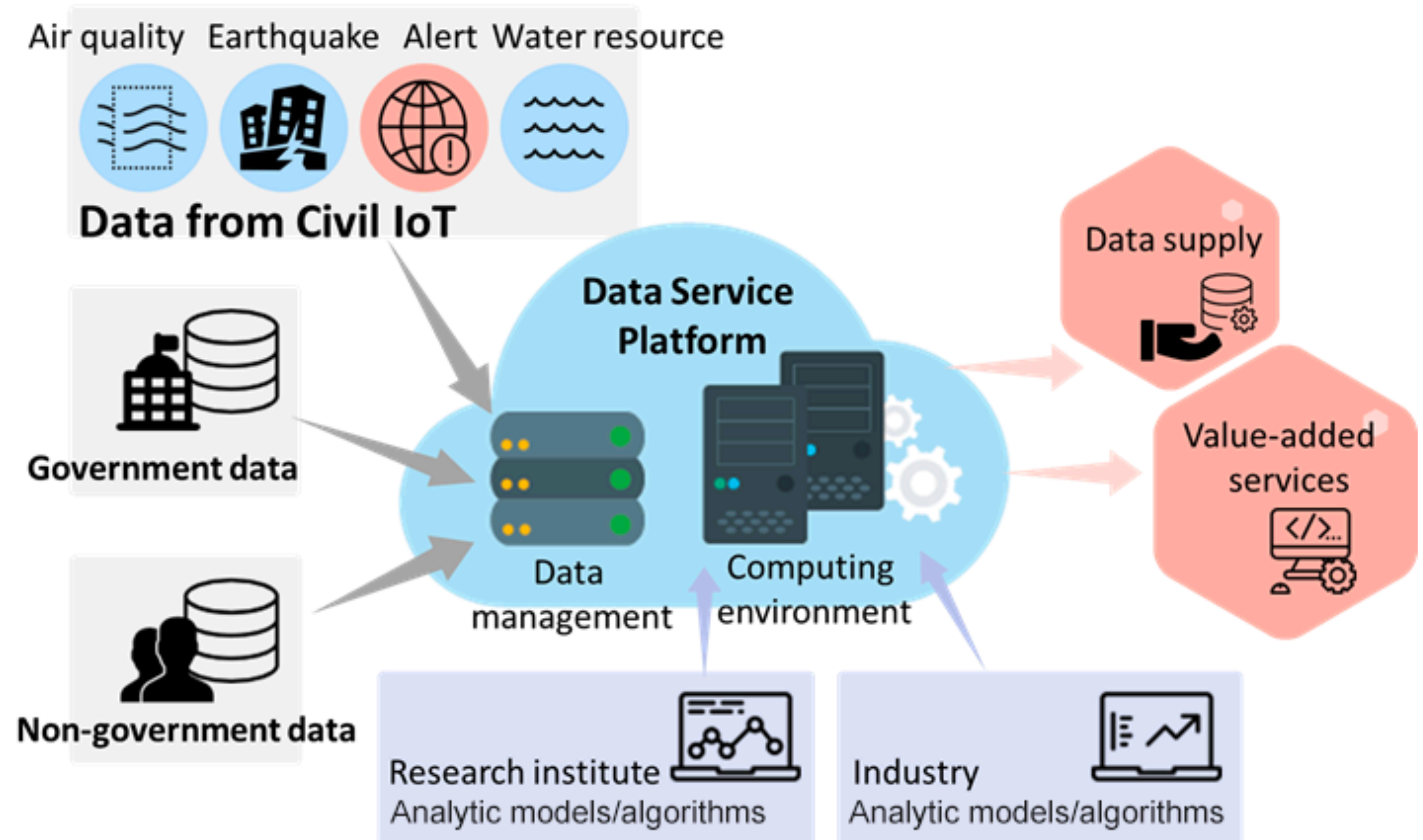
Developed by Cameo (卡米爾)

# The Civil Internet of Things (IoT) Project of Taiwan

## A national-wide project

- Providing real-time and historical Civil IoT sensing data by OGC SensorThings API
- Data visualization and search service
- Massive storage and computing power for simulation analysis and AI applications

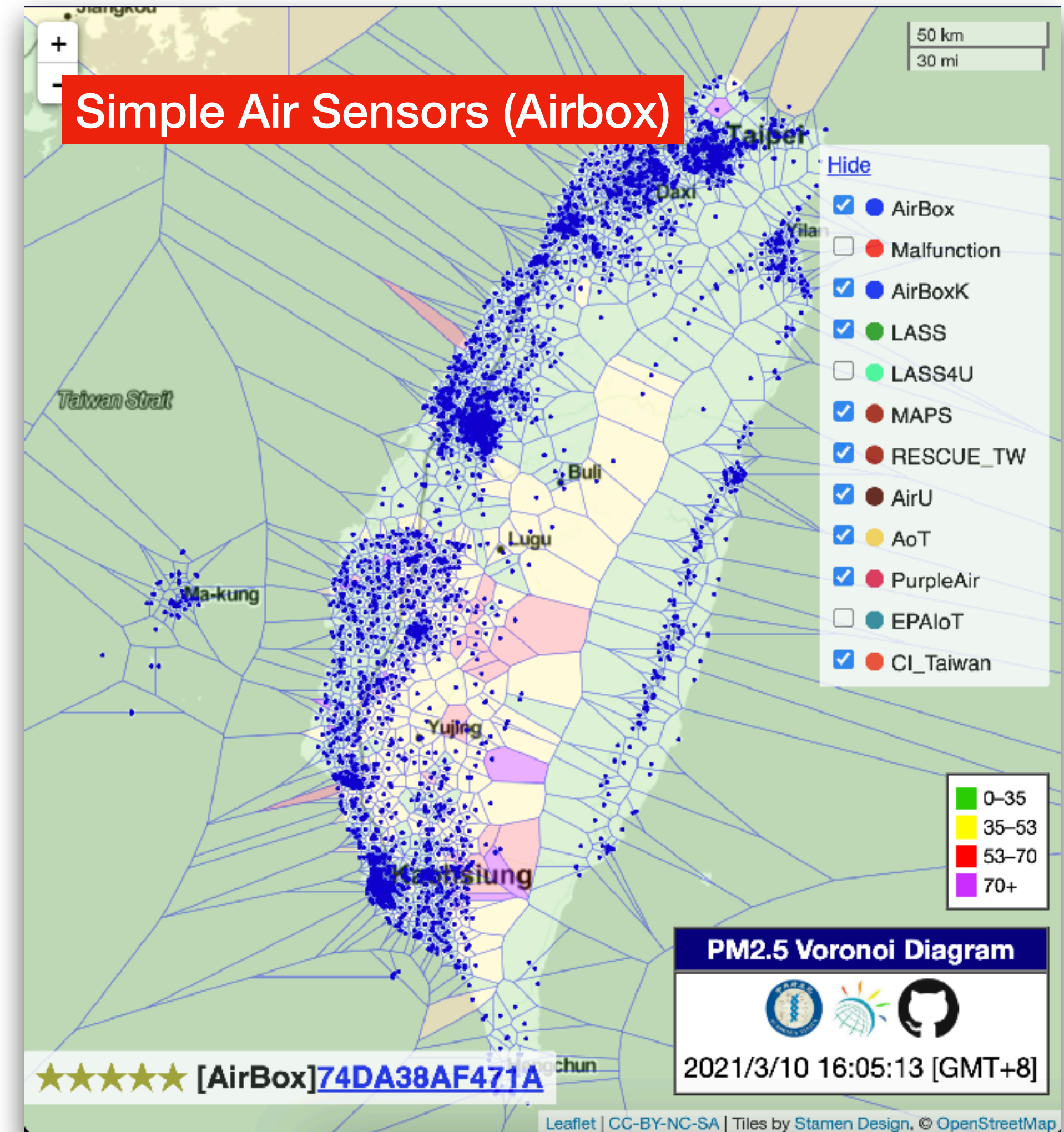
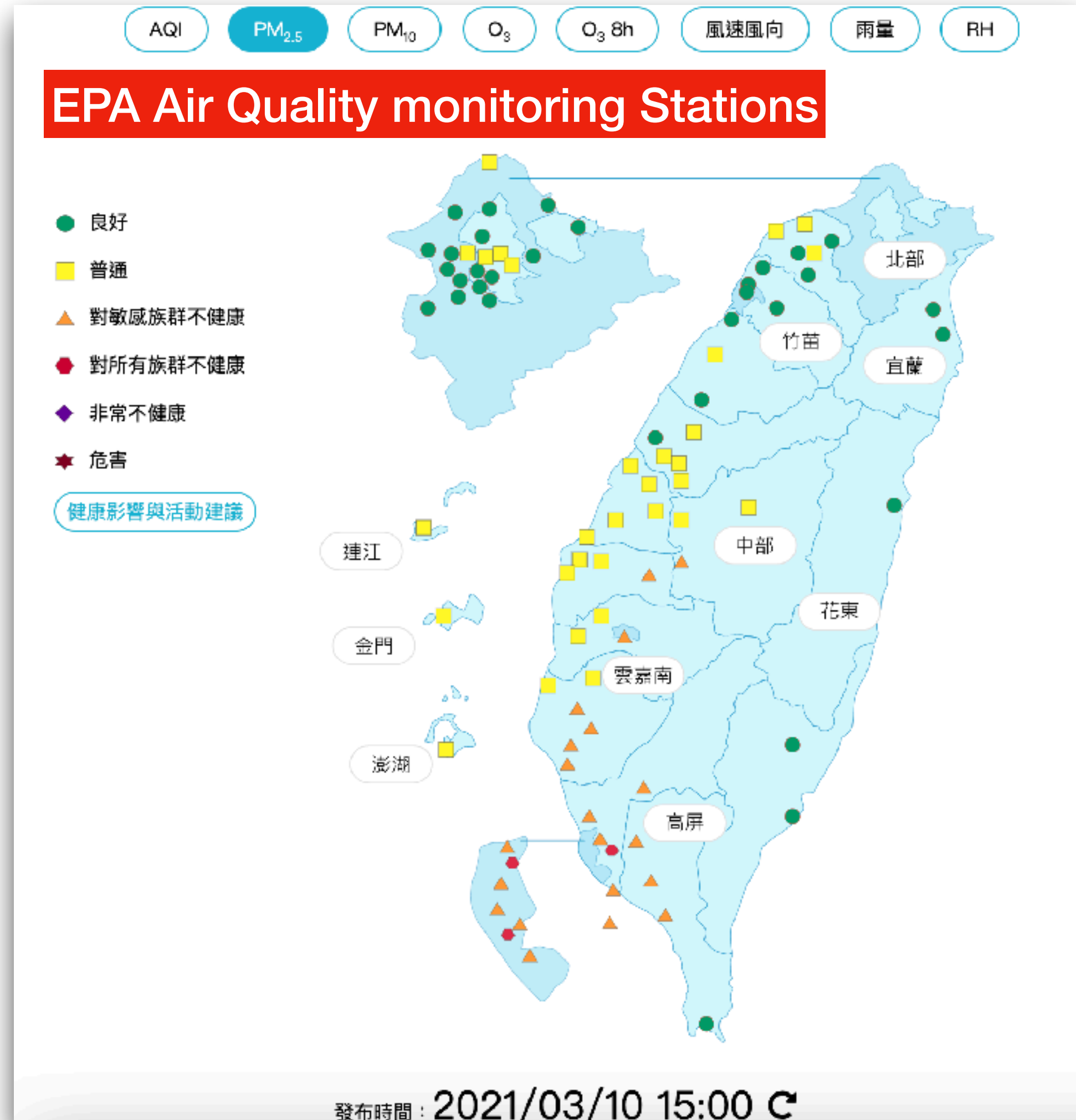
Platform: [https://ci.taiwan.gov.tw/dsp/en/environmental\\_en.aspx](https://ci.taiwan.gov.tw/dsp/en/environmental_en.aspx)



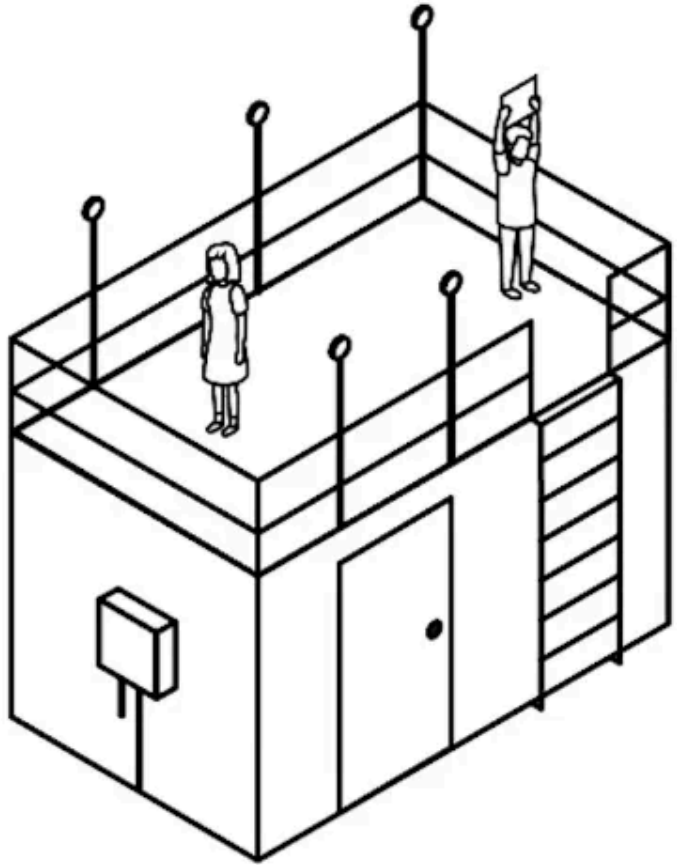

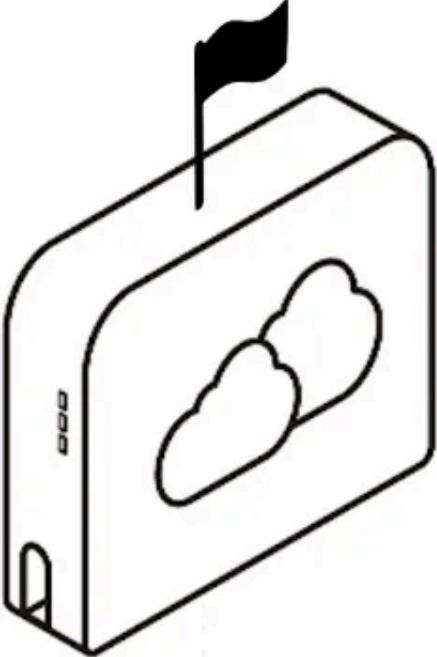
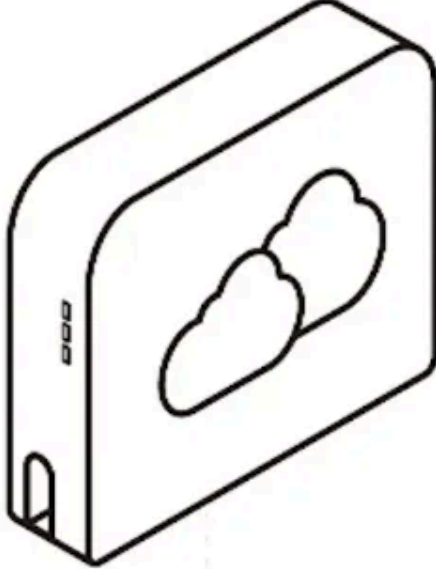


# Why needs civil IoT?

## Professional v.s. civic air quality monitoring



# Different levels of air quality sensors

Level	National Monitoring Stations	Smart City Sensors	Educational Sensors	Civil Sensors
Figure				
Purpose	Regulations	Hot zone determination	Envir. Education	Personal
Apply	Evaluate air quality in large area according to regulations	Detect air quality in small area for tracking pollution sources	Know the variety of air quality in micro environment	
Theory	Air-Beta Ray Attenuation Method or Air-Inertial Mass Method	Light scatter		
Particle definition	<b>Aerodynamic Diameter:</b> a sphere of particle which settles in still air at the same velocity	<b>Optical Diameter:</b> The particle diameter is measured by laser diffraction. The surface rough of particle, water, and absorbance would affect the measure		
Health risk relationship	Current health risk research use aerodynamic diameter	Not much health risk research use optical diameter currently		

# Smart City Sensors

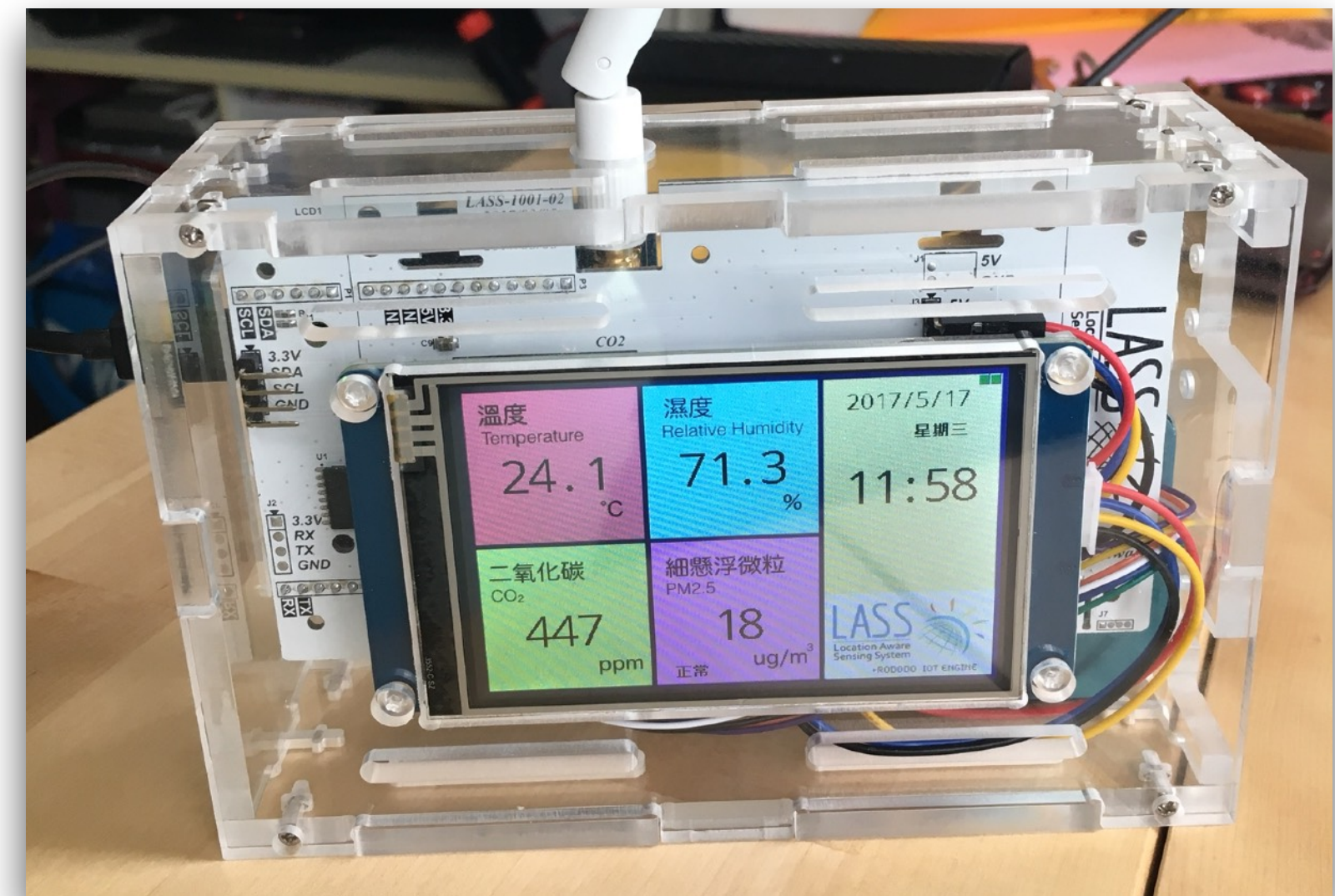
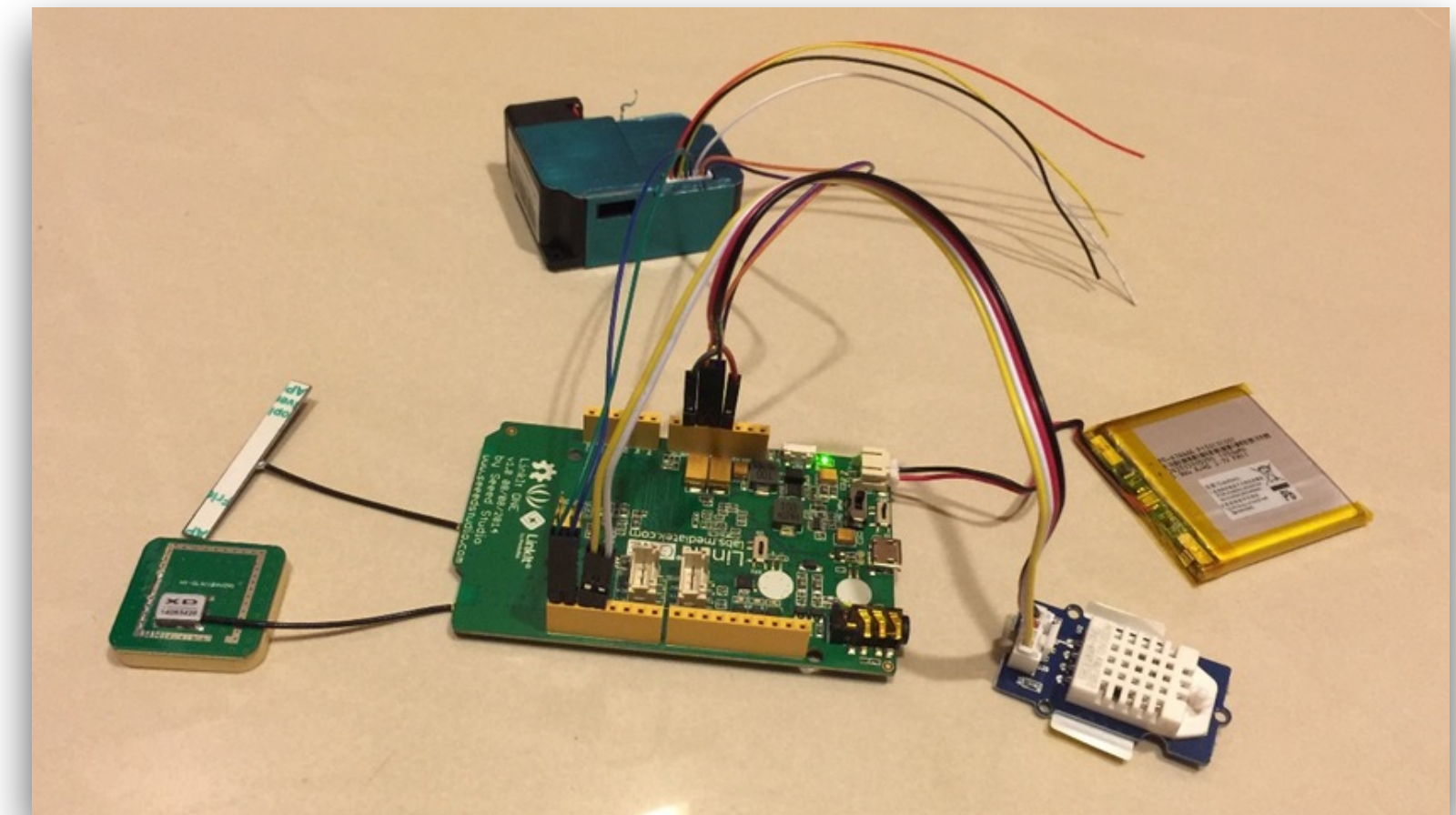
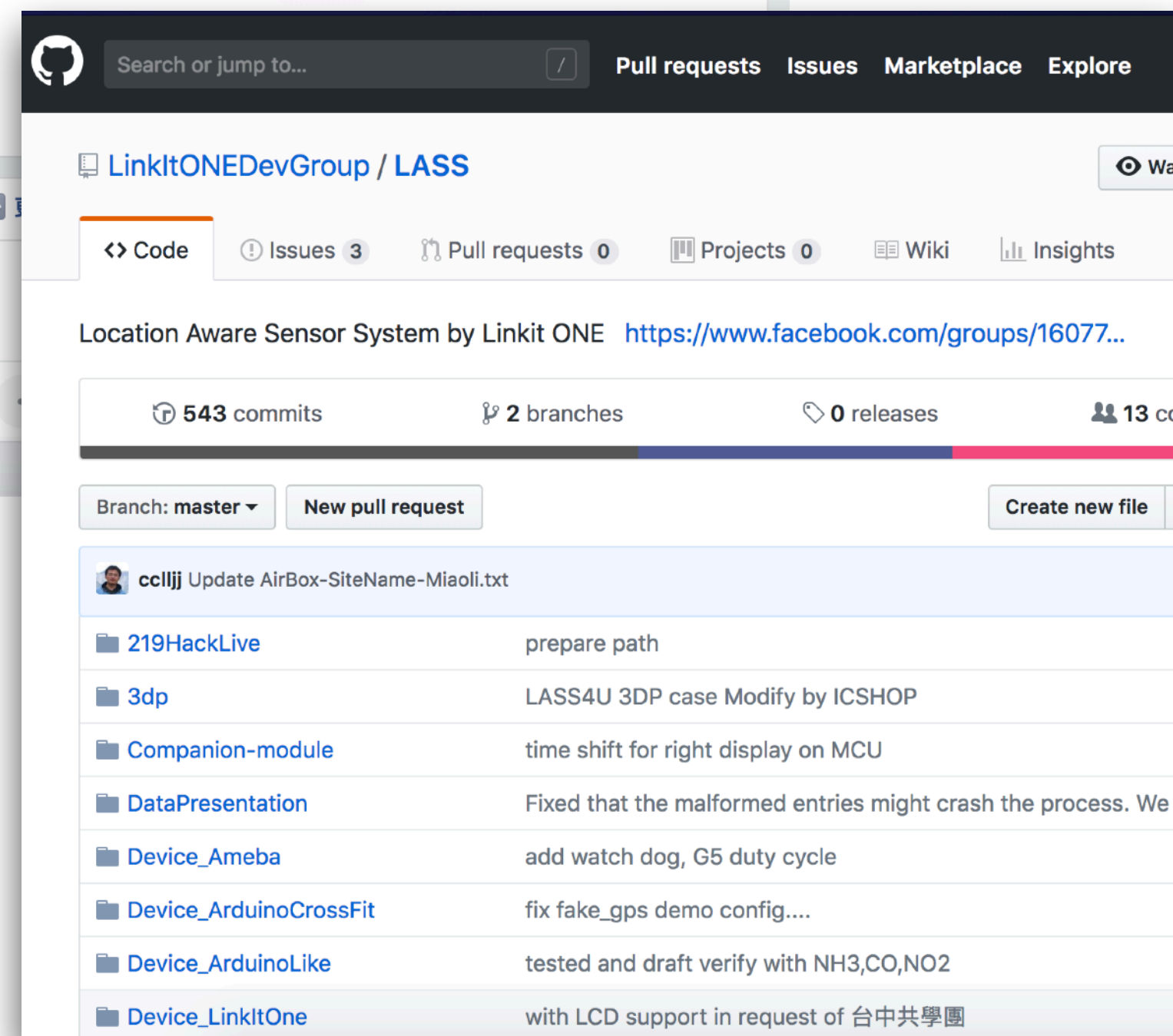
Air quality

Water quality

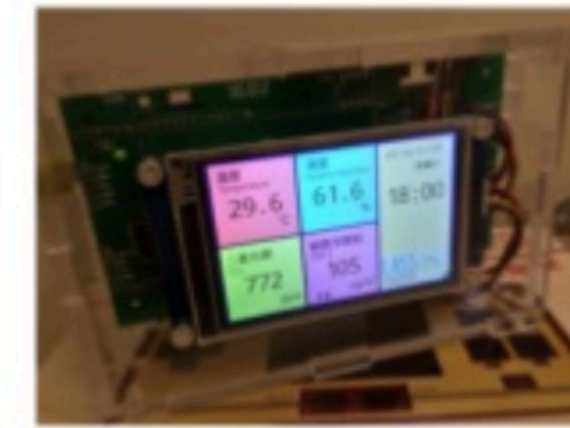
Mobile Air quality



# Collaboration with CivicTech communities

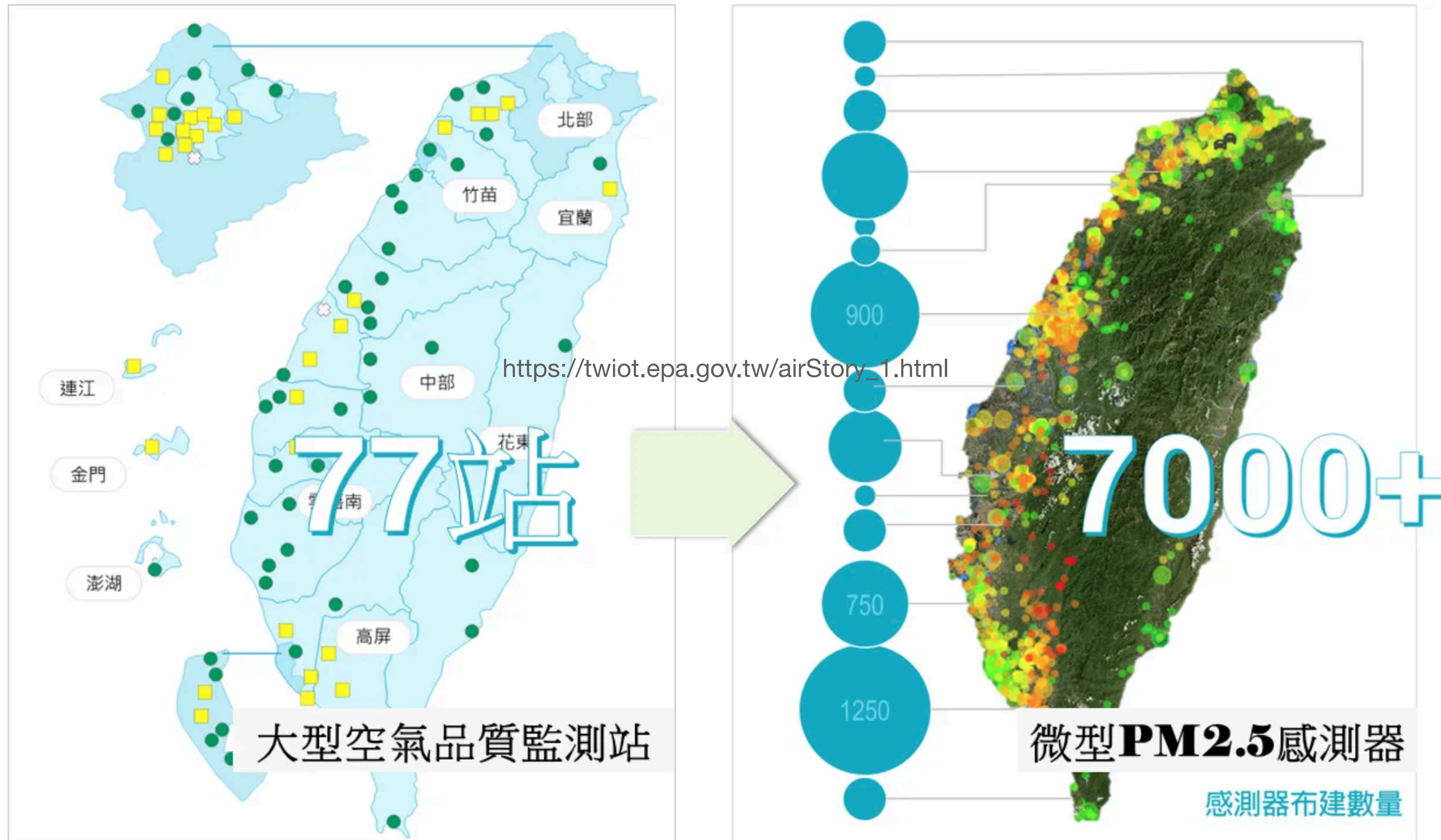


# Airbox: Community version for air quality monitoring



	LASS FT	AirBox	MAPS	LASS4U	87Live
Platform	MediaTek LinkIt One	Realtek Ameba	MediaTek LinkIt Smart 7688 Duo	Realtek Ameba	Realtek Ameba
T/H sensor	DHT22	HTS221	BME280	<b>SHT31</b>	<b>SHT31</b>
PM sensor	<b>PMS3003</b>	<b>PMS5003</b>	<b>PMS5003</b>	<b>PMS3003</b>	<b>PMS3003</b>
CO2 sensor	-	-	-	<b>SenseAir S8</b>	-
Air pressure	-	-	BME280	-	-
Open source	<b>YES</b>	-	<b>YES</b>	-	<b>YES</b>
Open data	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>
Phone app	-	<b>YES</b>	-	<b>YES</b>	<b>YES</b>
End user	makers	schools	academia	citizens	makers/citizens
Dimension (cm)	10.2 x 6.5 x 4.8	14.8 x 11.2 x 4.5	12.4 x 8.4 x 5.4	15 x 10 x 5	<b>12 x 7 x 4.2</b>
Price (USD)	90	110	90	140	<b>60</b>

# From national stations to micro sensors



# Civil IoT Air Quality datasets 民生公共物聯網空氣品質資料

民生公共物聯網 資料服務平台

資料展示 ▾ 資料目錄 ▾ API說明 應用成果 EN 民生公共物聯網

民生物聯網資料集 ▾

- 空氣品質
- 水資源
- 地震活動
- 氣象
- CCTV
- 災害示警與災情通報

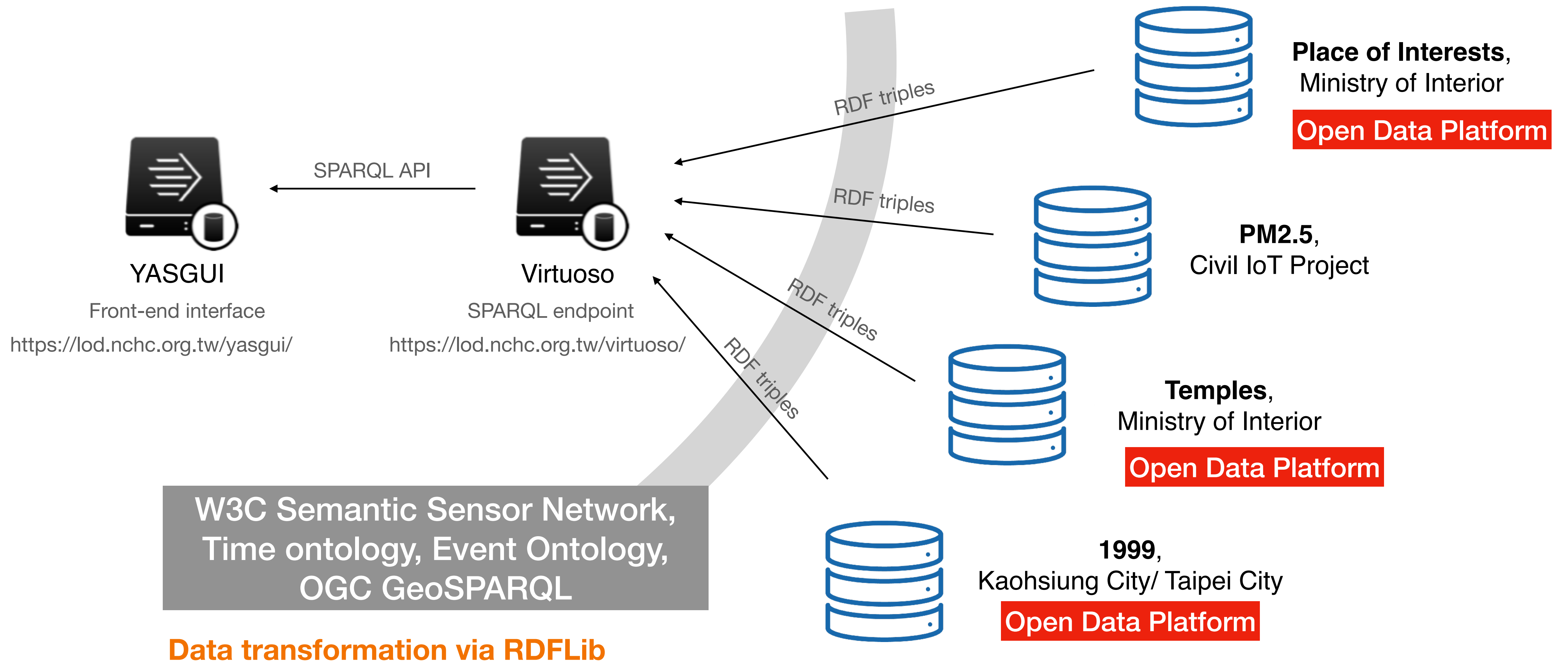
## 空氣品質相關資料集

歷史資料下載

提供單位	項目	數量	更新頻率	起始時間	API網址	歷史資料
環保署	國家空品測站	77站	每小時	1998年	<a href="#">API網址</a>	○
	智慧城鄉空品微型感測器	10,496站	3分鐘	2017年6月	<a href="#">API網址</a>	○
	空品監測即時影像器	64站	10分鐘	NA	<a href="#">API網址</a>	X
中研院	校園空品微型感測器	3233站	5分鐘	2017年9月	<a href="#">API網址</a>	○
國家科學及技術委員會	智慧園區空品測站	20站	每小時	2018年9月	<a href="#">API網址</a>	○
國網中心	大屯火山群小油坑空品感測器	3	不定期	2022年12月	<a href="#">API網址</a>	○
暨南大學	在地空品微型感測器 (PM2.5十分鐘平均值)	200站	每10分鐘	2019年12月	NA	○
大同股份有限公司	大同空品微型感測器	500站	每10分鐘	2019年10月	NA	○
台固	台固空品微型感測器	500站	每3分鐘	2020年01月	NA	X

[https://ci.taiwan.gov.tw/dsp/dataset\\_air.aspx](https://ci.taiwan.gov.tw/dsp/dataset_air.aspx)

# Data integration and process





# Virtuoso - text search

OPENLINK SOFTWARE

Text Search Entity Label Lookup Entity URI Lookup [Featured](#) | [Demo Queries](#) | [About](#)

### Precision Search & Find

Search Text

OPENLINK SOFTWARE

Displaying Ranked Entity Names and Text summaries where:

[?s1](#) has [any Attribute](#) with Value "天上聖母" [Drop](#).

[View query as SPARQL](#) [Facet permalink](#)  
[View as a Pivot collection \(edit query\)](#) [Query limit](#)  [Paged Snapshot](#)

Go to:  Show  1 - 12 of 12 total

Entity	Title	Named Graph
<a href="http://lod.tw/ciot/Temple/1771815">http://lod.tw/ciot/Temple/1771815</a>		天上聖母 夫人七姊妹.
<a href="http://lod.tw/ciot/Temple/1774052">http://lod.tw/ciot/Temple/1774052</a>		天上聖母,濟公禪師,觀世音菩薩.
<a href="http://lod.tw/ciot/Temple/1779745">http://lod.tw/ciot/Temple/1779745</a>		天上聖母,關聖帝君,天官大帝.
<a href="http://lod.tw/ciot/Temple/1766524">http://lod.tw/ciot/Temple/1766524</a>		天上聖母娘娘.
<a href="http://lod.tw/ciot/Temple/1772642">http://lod.tw/ciot/Temple/1772642</a>		天上聖母老六媽祖.
<a href="http://lod.tw/ciot/Temple/1772574">http://lod.tw/ciot/Temple/1772574</a>		天上聖母北極玄天上帝.
<a href="http://lod.tw/ciot/Temple/1771215">http://lod.tw/ciot/Temple/1771215</a>		天上聖母三令聖母.
<a href="http://lod.tw/ciot/Temple/1767403">http://lod.tw/ciot/Temple/1767403</a>		天上聖母五年千歲五府千歲.
<a href="http://lod.tw/ciot/Temple/1766015">http://lod.tw/ciot/Temple/1766015</a>		...
<a href="http://lod.tw/ciot/Temple/1770369">http://lod.tw/ciot/Temple/1770369</a>		天上聖母,方府千歲,順正府大王公.
<a href="http://lod.tw/ciot/Temple/1765945">http://lod.tw/ciot/Temple/1765945</a>		天上聖母老大媽.
<a href="http://lod.tw/ciot/Temple/1774015">http://lod.tw/ciot/Temple/1774015</a>		廣信府天上聖母宮.

Go to:  Show  1 - 12 of 12 total

Complete result - 12 processed in 11 msec.  
Resource utilization: 839 rnd 10 seq 752 same seg 12 same pg 0 same par 0 disk 0 spec disk 0B / 0 messages 0 fork

**Entity Relationship Filters**

- Type
- Attributes
- Values
- Distinct (Count)
- Places

Options  
Save  
[Featured Queries](#)  
[New Search](#)

# Virtuoso - browse a triple

The screenshot shows the OpenLink Virtuoso web interface. At the top left is the OpenLink Software logo. On the right, there are navigation tabs: Facets, Description, Metadata, and Settings (which is highlighted in green). Below the header, the main content area displays information about a specific triple:

**About:** <http://lod.tw/ciot/temple/1774052> [Goto](#) [Sponge](#) [NotDistinct](#) [Permalink](#)  
An Entity of Type : <https://schema.org/PlaceOfWorship>, within Data Space : [lod.nchc.org.tw](http://lod.nchc.org.tw) associated with source [document\(s\)](#)  
Type:  Command:

---

Attributes	Values
<a href="#">rdf:type</a>	<a href="#">owl:NamedIndividual</a> <a href="#">ogcgs:Feature</a> <a href="https://schema.org/PlaceOfWorship">https://schema.org/PlaceOfWorship</a>
<a href="https://schema.org/longitude">https://schema.org/longitude</a>	120.359703( <a href="#">xsd:float</a> )
<a href="https://schema.org/latitude">https://schema.org/latitude</a>	23.746811( <a href="#">xsd:float</a> )
<a href="#">ogcgs:asWKT</a>	POINT(120.3597031 23.74681091)
<a href="http://lod.tw/ciot/adminArea">http://lod.tw/ciot/adminArea</a> <a href="http://lod.tw/ciot/deity">http://lod.tw/ciot/deity</a>	天上聖母, 濟公禪師, 觀世音菩薩
<a href="http://lod.tw/ciot/isResponsibleBy">http://lod.tw/ciot/isResponsibleBy</a> <a href="http://lod.tw/ciot/registerType">http://lod.tw/ciot/registerType</a> <a href="http://lod.tw/ciot/religionType">http://lod.tw/ciot/religionType</a>	
<a href="https://schema.org/address">https://schema.org/address</a>	雲林縣高賓鄉高前村崗仔背17鄰3之56號
<a href="https://schema.org/name">https://schema.org/name</a>	菩提宮
<a href="https://schema.org/taxID">https://schema.org/taxID</a> <a href="https://schema.org/telephone">https://schema.org/telephone</a>	05-6967766

Faceted Search & Find service v1.17\_git69 as of Jun 22 2021

Alternative Linked Data Documents: [ISPARQL](#) | [ODE](#) Content Formats: [CSV](#) [CSV](#) [RDF](#) [N-Triples](#) [N-Quads](#) [JSON-LD](#) [JSON](#) [XML](#) [ODATA](#) [ATOM](#) [JSON](#) [Microdata](#) [JSON](#) [HTML](#) [About](#)

# An example of SPARQL query

SPARQL query is similar to SQL

Find out the PM2.5 sensors observing over 300  $\mu\text{g}/\text{m}^3$  and the distance to temples within 500 meters

```
PREFIX ciot: <http://lod.tw/ciot/>
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
PREFIX sosa: <http://www.w3.org/ns/sosa/>
PREFIX qudt: <https://qudt.org/schema/qudt/>
PREFIX schema: <https://schema.org/>

SELECT ?sensor, ?pm25, ?temple_name, ?god, ?time
from <http://lod.tw/ciot/>|
WHERE {
    ?obs sosa:resultTime ?time ;
        sosa:hasResult ?value;
        sosa:madeBySensor ?sensor .
    ?value qudt:numericValue ?pm25 .
    ?sensor ciot:hasSite ?site.
    ?site geo:asWKT ?geo1.

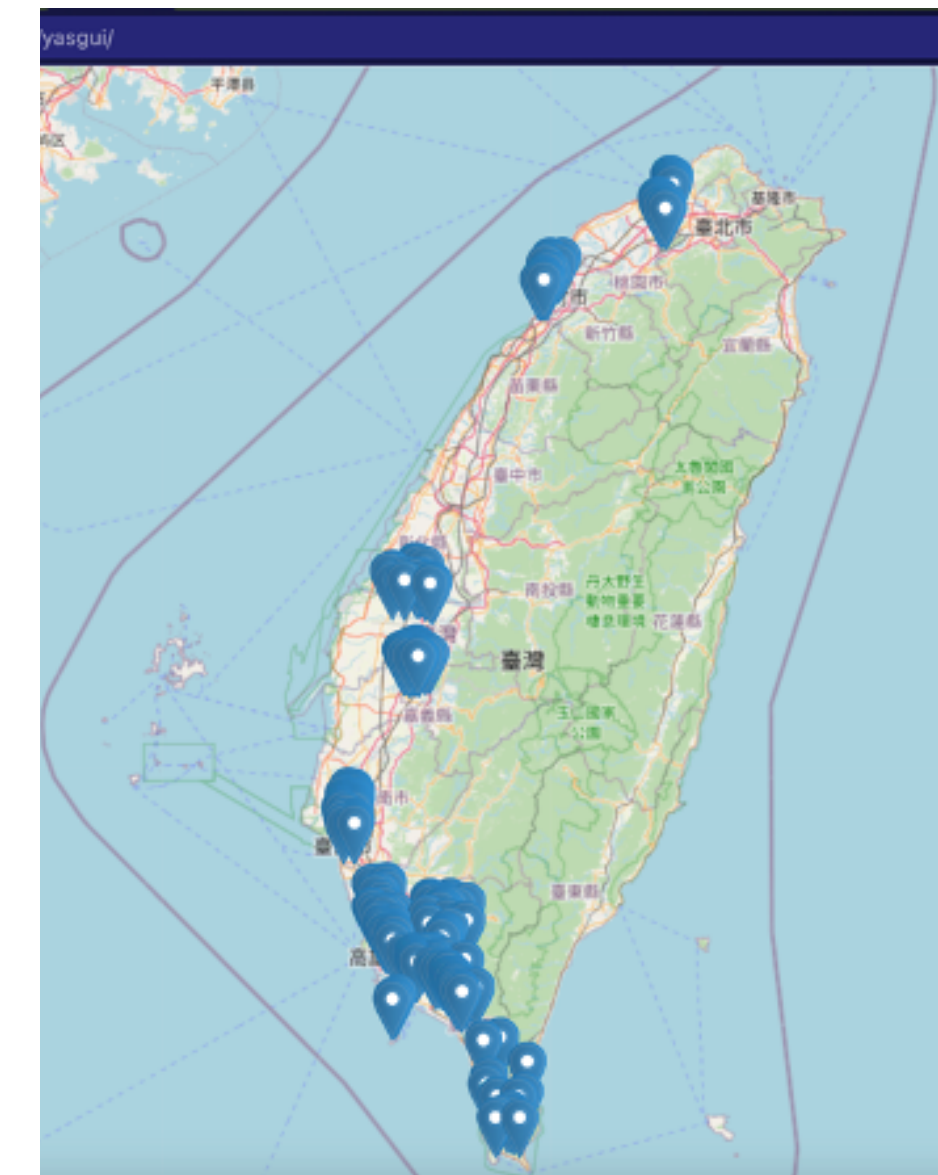
    ?temple a schema:PlaceOfWorship;
        geo:asWKT ?geo2;
        schema:name ?temple_name;
        ciot:deity ?god.
    FILTER (?pm25 > 300)
    FILTER (bif:st_within( ?geo1, ?geo2, 500))
}
```

# YASGUI - SPARQL query

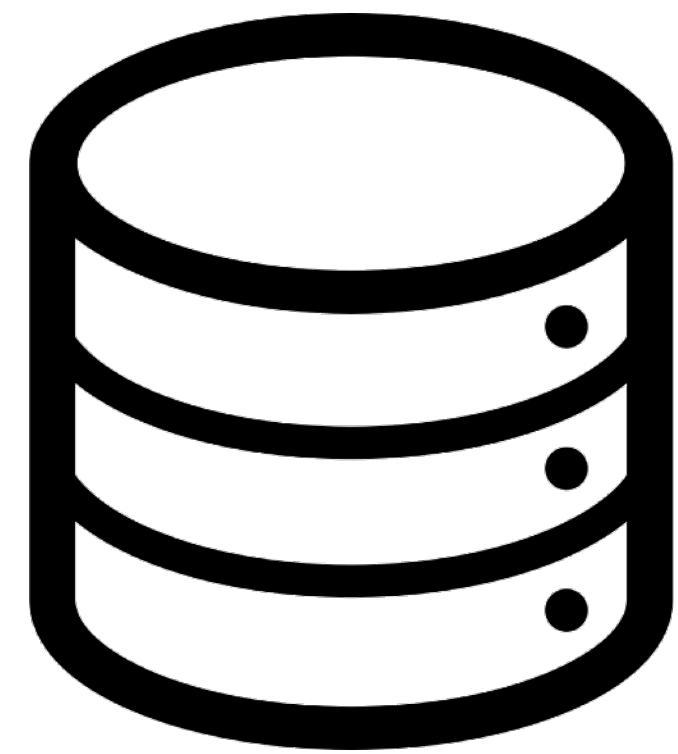
The screenshot shows the YASGUI web interface. At the top, the browser address bar displays "lod.nchc.org.tw/yasgui/". Below the address bar, there is a "Query" input field with a dropdown menu set to "http://lod.nchc.org.tw/virtuoso/sparql". The main area contains a SPARQL query:

```
4 PREFIX qdt: <https://qdt.org/schema/qdt/>
5 PREFIX schema: <https://schema.org/>
6
7 SELECT ?sensor, ?pm25, ?temp_name, ?god, ?time, ?geol
8 from <http://lod.tw/ciot/>
9 WHERE {
10     ?obs sosa:resultTime ?time ;
```

Below the query editor, there are several tabs: "Table", "Response", "Pivot Table", "Google Chart", and "Geo" (which is selected). A tip below the tabs reads: "Tip: Add a label variable prefixed with the geo variable name to show popups on the map. E.g. `geoLabel`. Or, append `Color` to change the color of the shape or marker." The main part of the interface is a map of Taiwan with several blue location markers placed across the island. The map includes labels for various cities and regions in Chinese, such as Taipei (臺北市), Taichung (臺中市), and Keelung (基隆市). The URL in the bottom left corner is "lod.nchc.org.tw/yasgui/#qk710s".

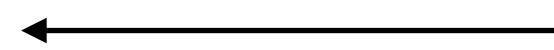


# Apply of Generative AI to civil IoT data analysis



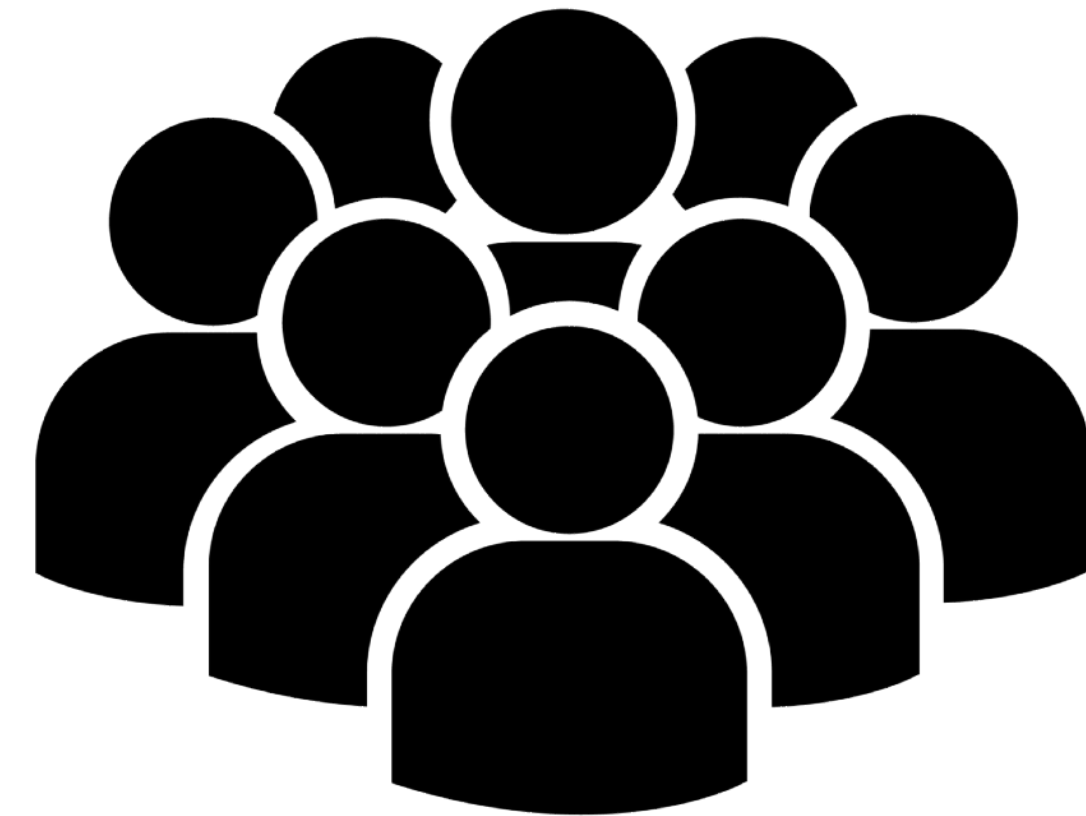
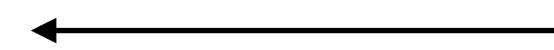
Civil IoT Data

obtain & analyze



A generative AI

use



Users

If you're not a data scientist or you're even not familiar with how to deal with data, a smart 'assistant' is quit helpful

# Generative AI for data process



To get more detail

<https://www.youtube.com/watch?v=MtCsDPbecyw&t=1s>  
<https://www.youtube.com/watch?v=sSCOGKC3SL4&t=5s>

# Generative AI for data process

## Make a map for spatial distribution of flooding sensors

001 請用 plotly 的 density\_mapbox 繪製台灣地圖  
002 將 Plotly.js 庫直接嵌入到 HTML 文件中。可以設定 include\_plotlyjs=True  
003 將 data/flood-sensor\_20230903-0905\_clean.csv 的資料繪製到台灣地圖上。  
'Longitude', 'Latitude' : 為座標欄位  
'value': 為主要淹水數值欄位  
希望滑鼠點到地圖上資料點位時，顯示： timestamp , station\_id, CategoryInfos\_Name, value

```
@begin code("./users/wengroy/code/plot_map.py")
import pandas as pd
import plotly.express as px

# Load the data
df = pd.read_csv('data/opendata/flood-sensor_20230903-0905_clean.csv')

# Create the map
fig = px.density_mapbox(df, lat='Latitude', lon='Longitude', z='value', radius=10,
                        center=dict(lat=23.5, lon=121), zoom=7,
                        mapbox_style="stamen-terrain",
                        hover_data=['timestamp', 'station_id', 'CategoryInfos_Name',
                                   'value'])

# Save the map as HTML
fig.write_html("users/wengroy/code/flood_map.html", include_plotlyjs=True)
@end
```

[flood\\_map.html](#)



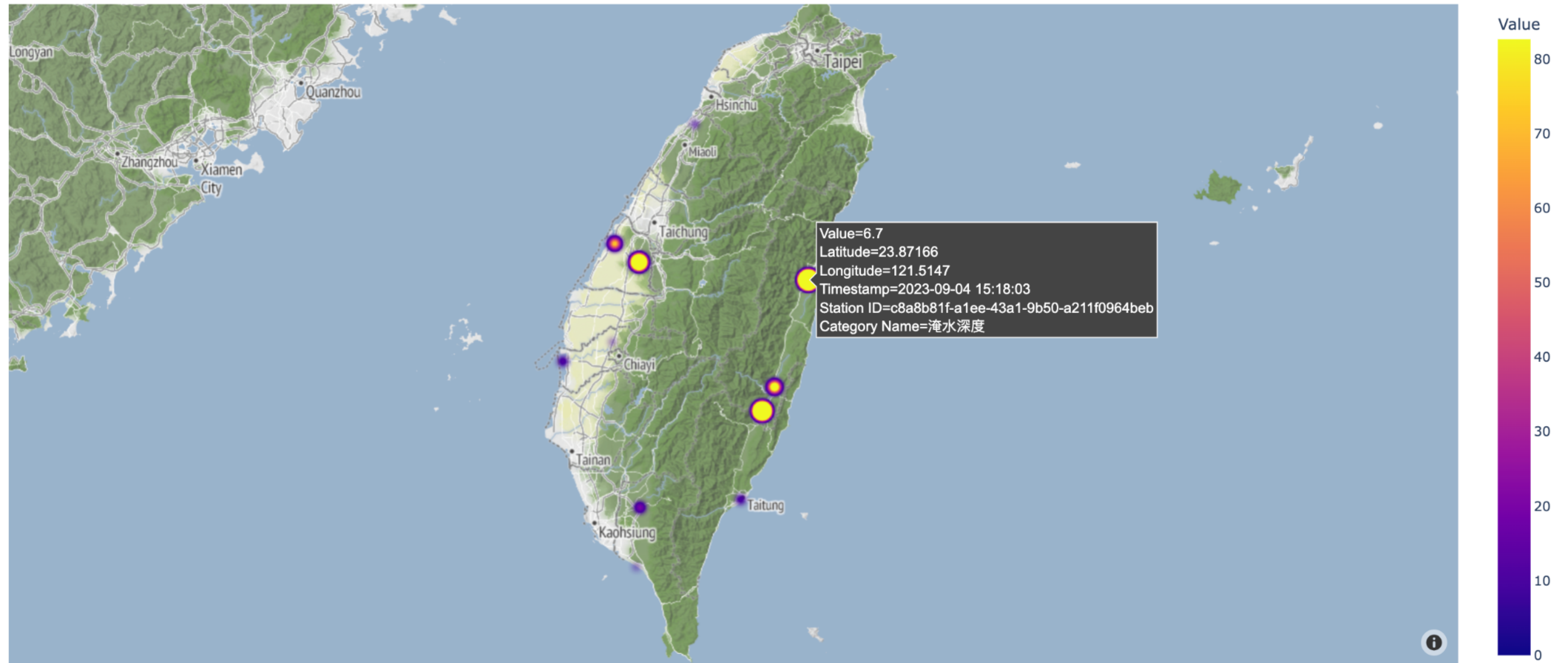
Type your message...



# Generative AI for data process

## Make a map for spatial distribution of flooding sensors

Taiwan Flood Sensor Data



[https://botrun.ai/api/users/wengroy20231002/code/flood\\_map.html](https://botrun.ai/api/users/wengroy20231002/code/flood_map.html)



# Generative AI for data process

## Make a box plot for flooding condition

001 請用 plotly 的 box 繪製  
002 將 Plotly.js 庫直接嵌入到 HTML 文件中。可以設定 include\_plotlyjs=True  
003 將 data/flood-sensor\_20230903-0905\_clean.csv 的資料，以 station\_id 為 x 軸  
'value': 為 y 軸主要淹水數值欄位

```
@begin code("./users/wengroy/code/flood_box.py")
import pandas as pd
import plotly.express as px

# Load data
df = pd.read_csv('data/opendata/flood-sensor_20230903-0905_clean.csv')

# Create box plot
fig = px.box(df, x='station_id', y='value', title="Box Plot of Flood Sensor
Data")

# Save to HTML
fig.write_html("users/wengroy/code/flood_box.html", include_plotlyjs=True)
@end
Box Plot of Flood Sensor Data
```

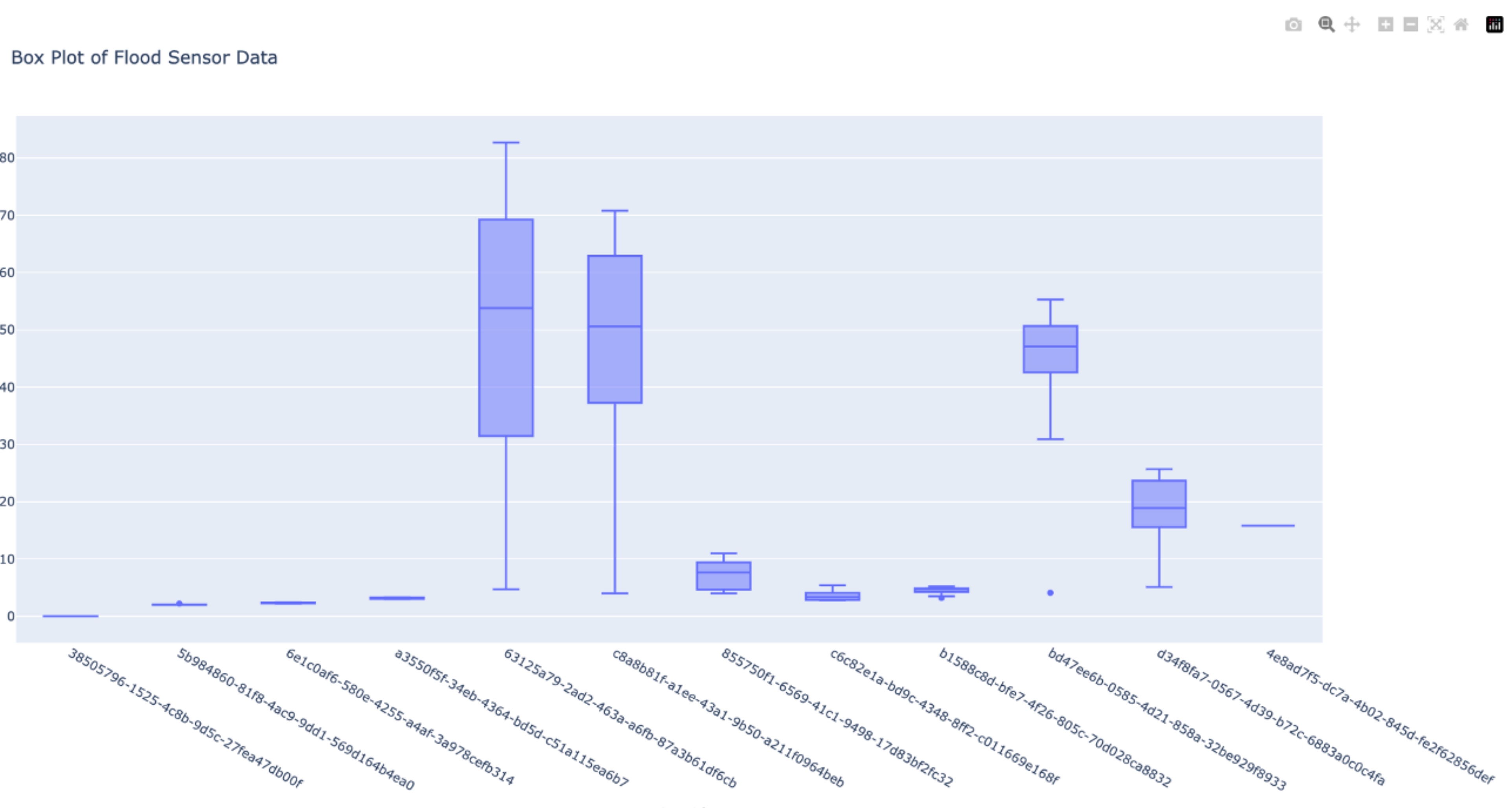


Type your message...



# Generative AI for data process

## Make a box plot for flooding condition



# Generative AI for data process

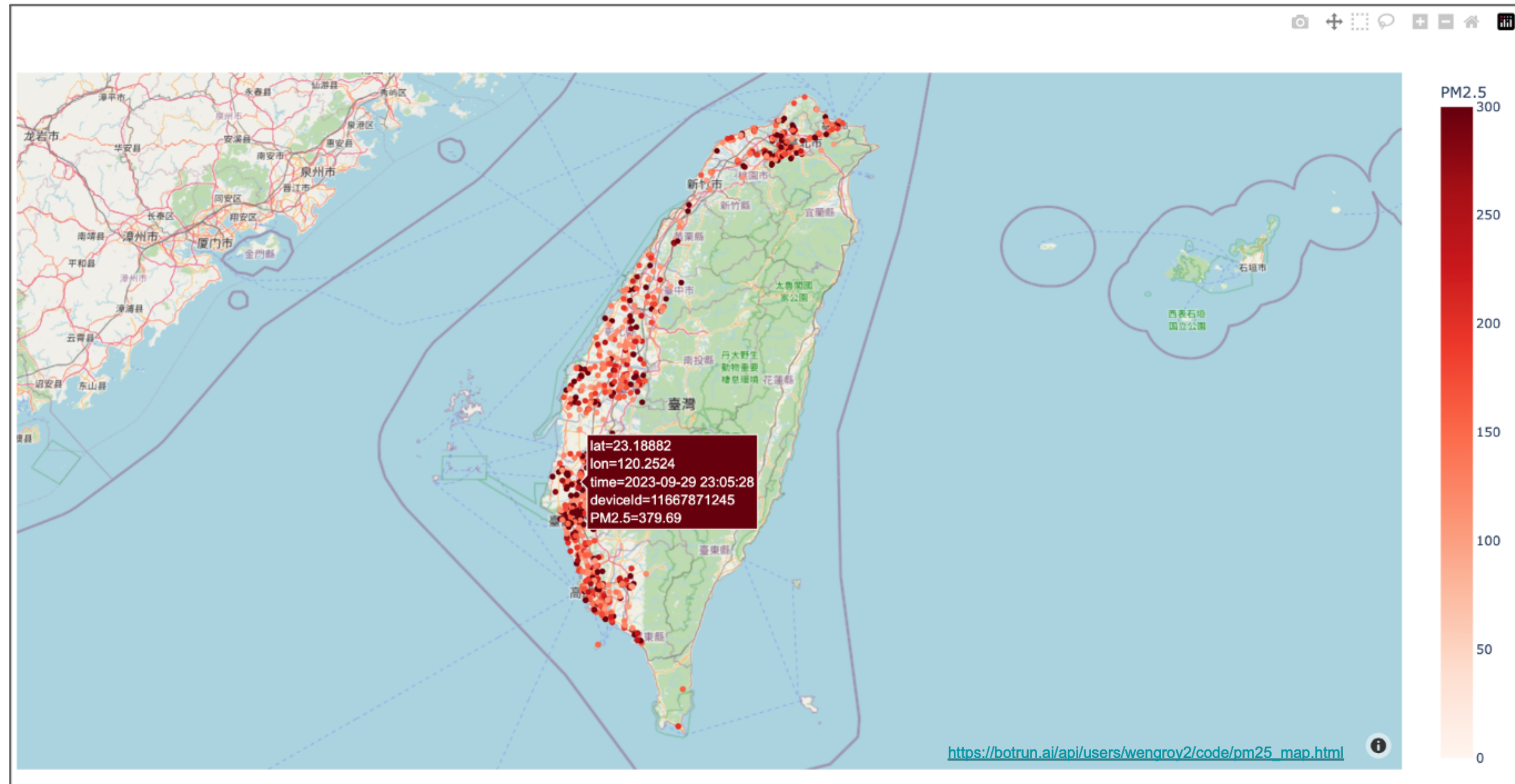
## Apply to air quality data (PM2.5)

```
the 'PM2.5' value ranging from 0-300 and use red color.  
  
@begin code("./users/wengroy2/code/plot_map.py")  
import pandas as pd  
import plotly.express as px  
  
# Load the data  
data = pd.read_csv('./users/wengroy2/data/opendata-  
air/moenv_micro_pm25_20230929.csv')  
  
# Filter the data  
filtered_data = data.loc[data.groupby('deviceId')  
['PM2.5'].idxmax()  
filtered_data = filtered_data[filtered_data['PM2.5'] > 100]  
  
# Create the map  
fig = px.scatter_mapbox(filtered_data, lat='lat', lon='lon',  
color='PM2.5', hover_data=['time', 'deviceId', 'PM2.5'],  
color_continuous_scale='reds', range_color=[0,300])  
fig.update_layout(mapbox_style="open-street-map")  
fig.write_html("./users/wengroy2/code/pm25_map.html",  
include_plotlyjs=True)  
@end
```

[pm25\\_map.html](#)

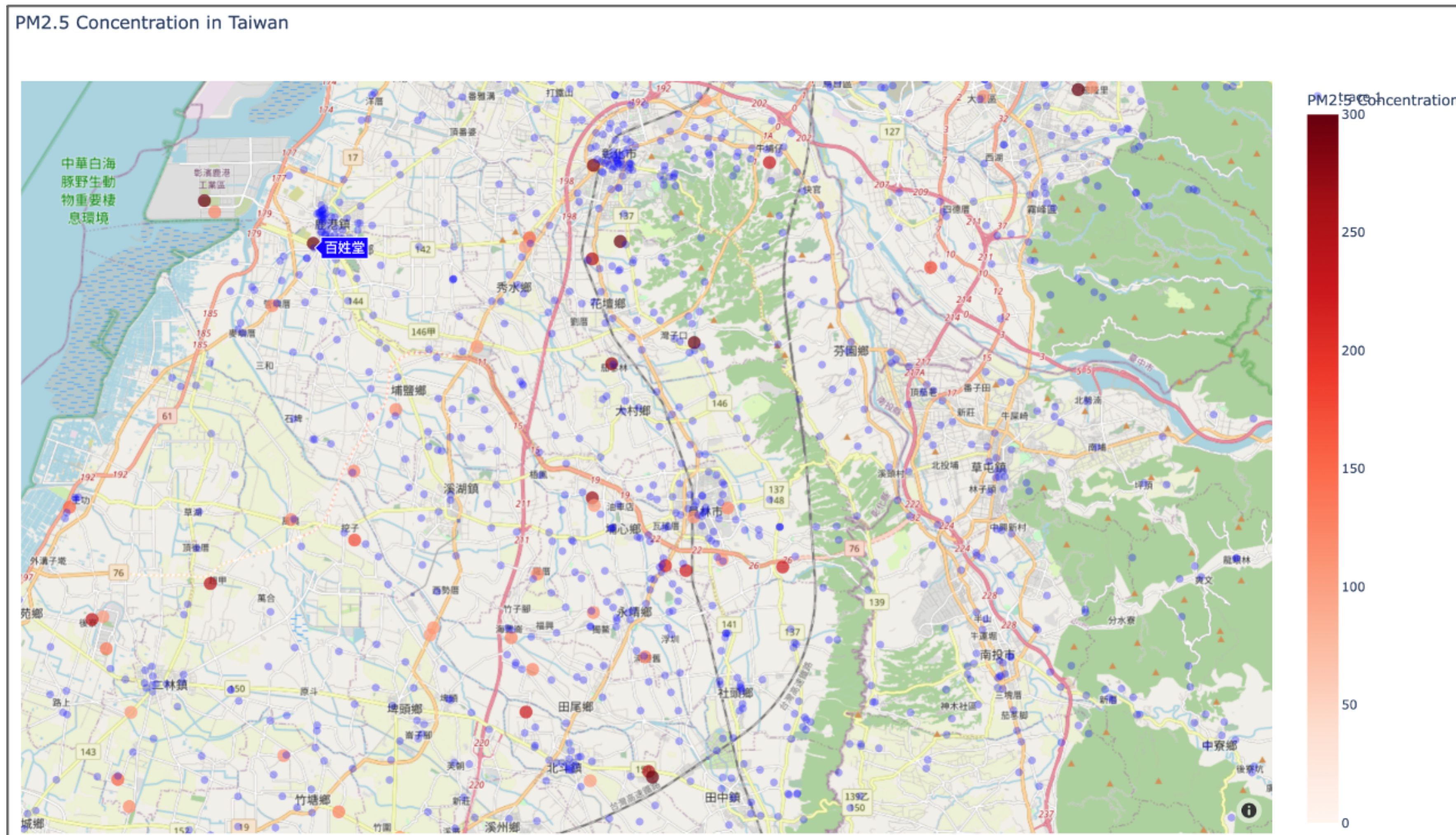
# Generative AI for data process

## PM2.5 in Mid-Autumn Festival 2004



# Generative AI for data process

## PM2.5 in Mid-Autumn Festival 2004





Thank for your  
attentions!

Contact email  
[dongpo.deng@gmail.com](mailto:dongpo.deng@gmail.com)