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SAPPORO GAKUIN UNIVERSITY

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Mobility Day, TNC24, Rennes

Mapping work beyond the OpenRoaming

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cityroam

OpenRoaming deployment in JAPAN

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2017
The NGHSIG (Workgroups of researchers and private operators in JAPAN) has begun its activities.
NGHSIG has begun development of a roaming federation testbed.
It connected to “City Wi-Fi Roaming trial 2017 (WBA)” from June to August 2017.

2018
The NGHSIG decided to call its roaming federation as **Cityroam**.
Sapporo Gakuin University connected all APs on campus to Cityroam.
Cityroam connected to “City Wi-Fi Roaming trial 2018 (WBA)”.

2019
Cisco proposed **OpenRoaming**, which was later transferred to WBA (2020-).

2020
Cityroam joined OpenRoaming as one of its earliest WBA members.

2024
Cityroam is currently a federation of 4 universities and 9 businesses.
In principle, Cityroam base stations have **eduroam** in addition to OpenRoaming.

OpenRoaming in the World

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Sometimes see sentences like this.

“OpenRoaming is available in 1 million locations worldwide,
mainly in Europe and the United States,
and has approximately 1 billion users.”

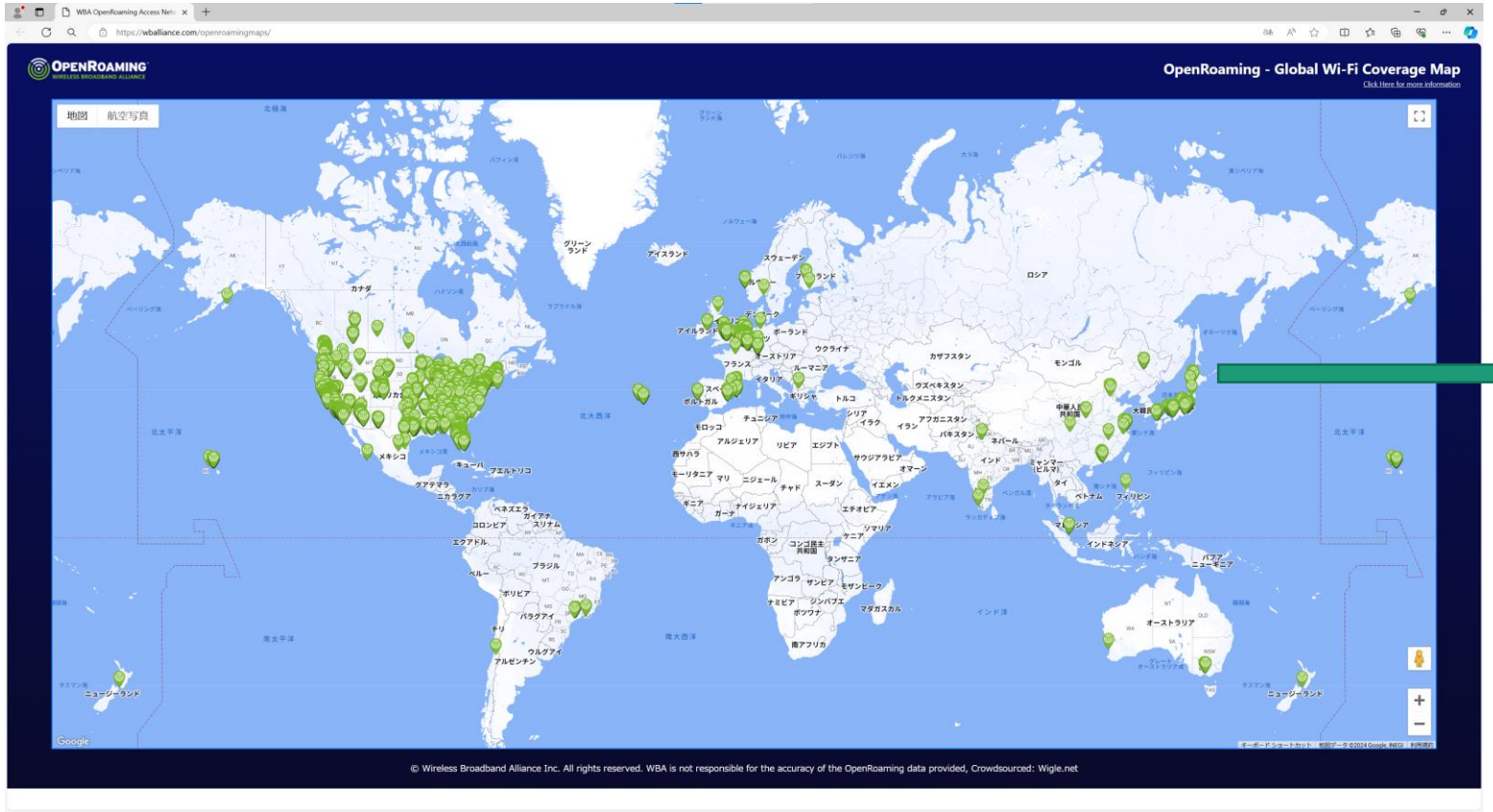
1,000,000 locations and 1,000,000,000 users.

Really?

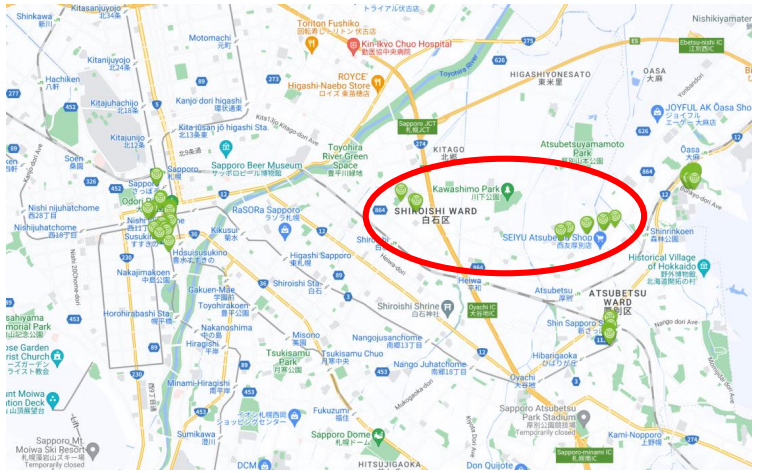
WBA OpenRoaming Map

https://wballiance.com/openroamingmaps/

Based on WiGLE data by a commercial arrangement.



My local (Sapporo)



I know All OpenRoaming APs in my local, but the MAP does not match with.

WiGLE (Wireless Geographic Logging Engine)

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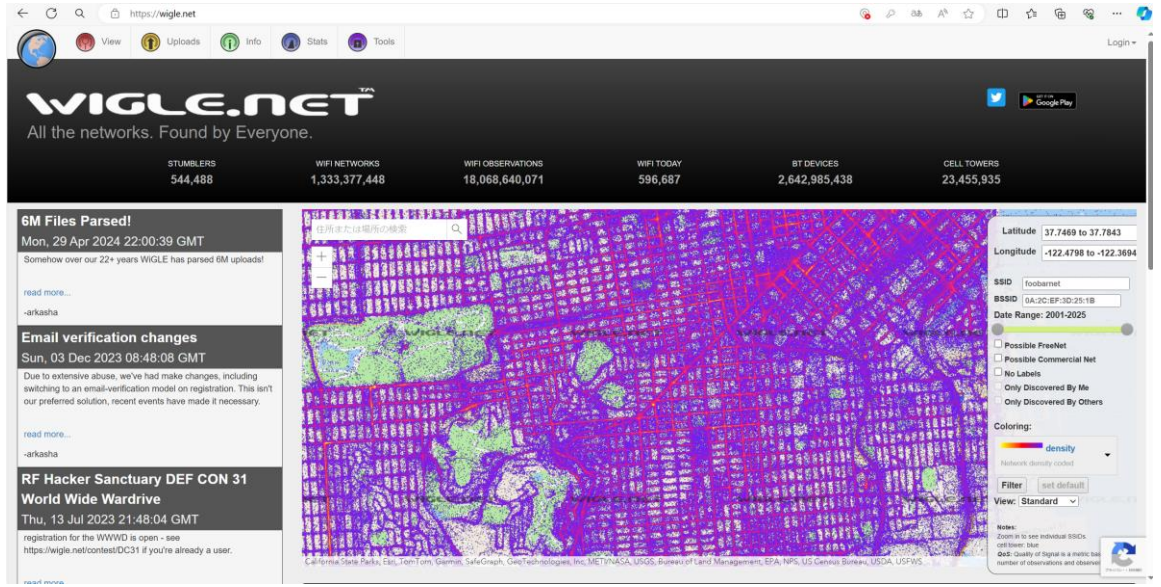
https://wigle.net/

Users can register on the website and upload hotspot data
like GPS coordinates, SSID, MAC address, and RCOI (Roaming Consortium OI).

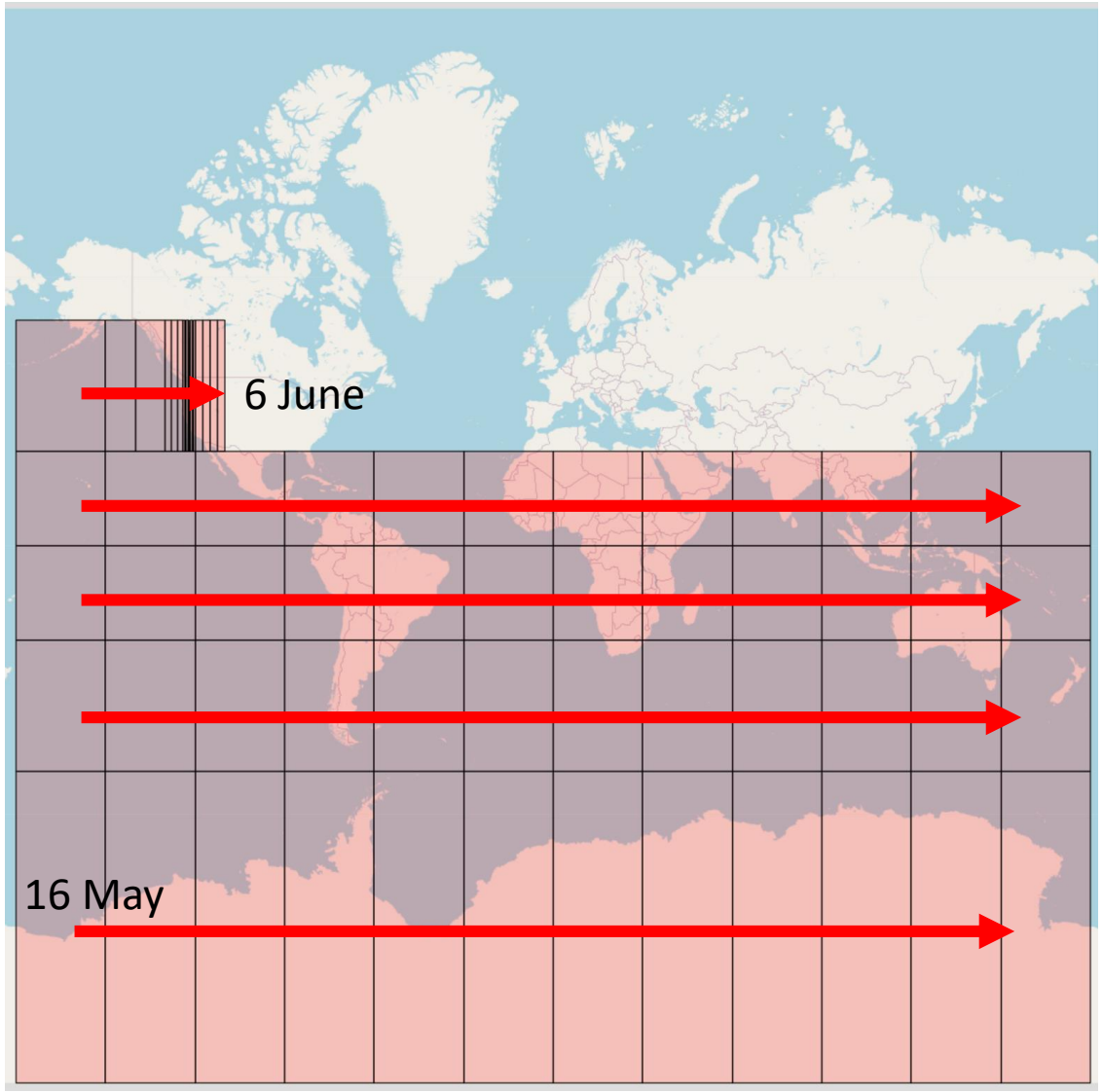
WiGLE App on Android

Uploads

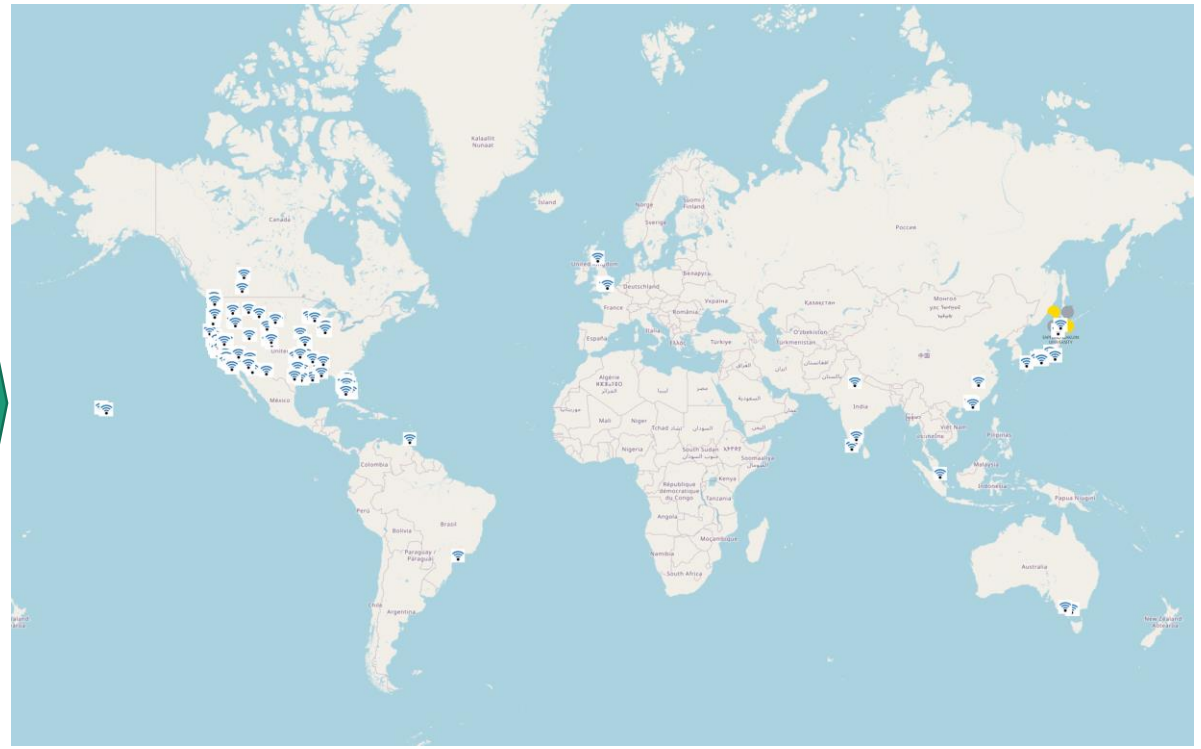


And WiGLE has the API.

Build own OpenRoaming Map (for personal use)



The number of APs you can get per day from the WiGLE API without a special contract is 10000 with a defined procedure.



Currently 6129 OpenRoaming APs.
(except half of US and entire Europe)

Build own OpenRoaming Map (for personal use)

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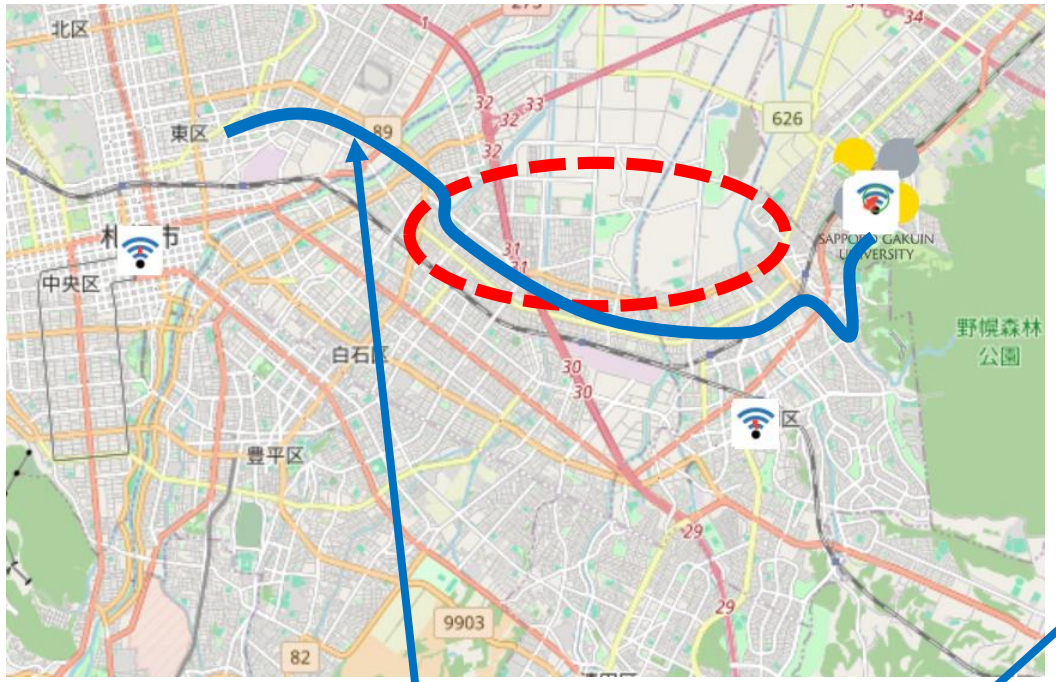
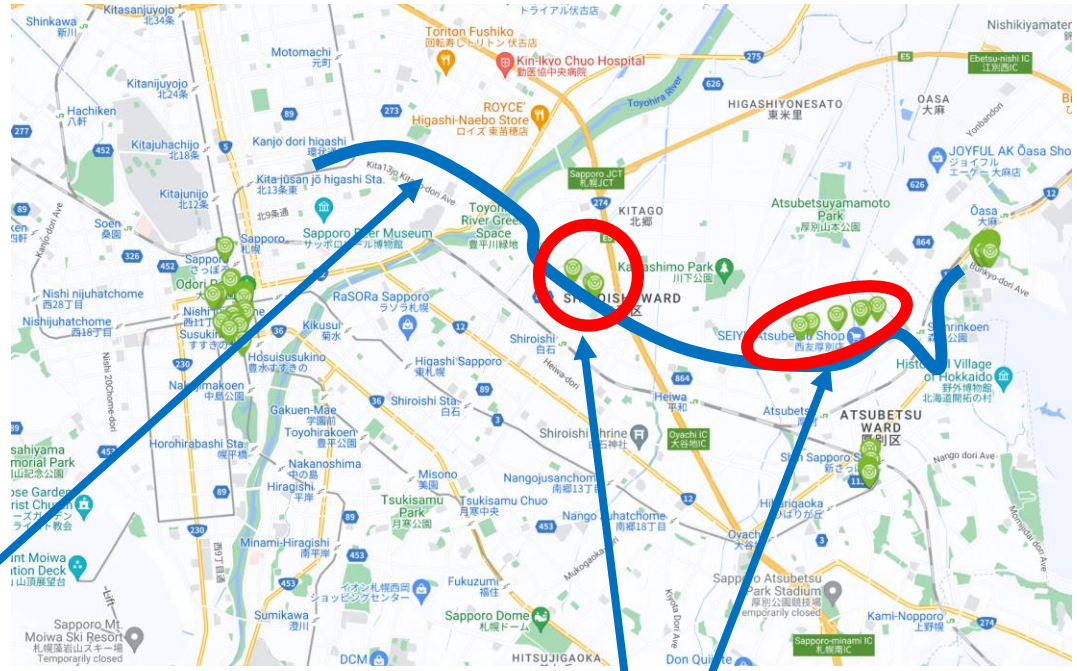
My local (Sapporo, JAPAN)

My map



WBA map



My commuting route

Why ?

Wrong location

My Mapping

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1) Obtain data from various APs that have at least one RCOI set within a specific latitude and longitude and whose last update date is after March 19, 2020 (i.e. the date when OpenRoaming is supposed to have started).

2) Extract only those with RCOI “004096” or “5A03BA0000”.

“you can retrieve specific RCOIs with the API ” - Stefan Paetow

3) If duplicate APs are acquired, keep the one with the higher QoS, or if the QoS is the same, keep only the one with the latest confirmed Time.

For more reliability - WiGLE QoS Score

WiGLE AP observations are sometimes incorrectly location reported.

WiGLE API parameter has minQoS : Minimum Quality of Signal (0-7).

“QoS Stands for Quality of Service.
This is an arbitrary WiGLE metric for an observed point.
If an AP is seen on more than one day, or by more than one user,
the QOS goes up, because it's more likely to be stable. ”

For more reliability - WiGLE QoS Score

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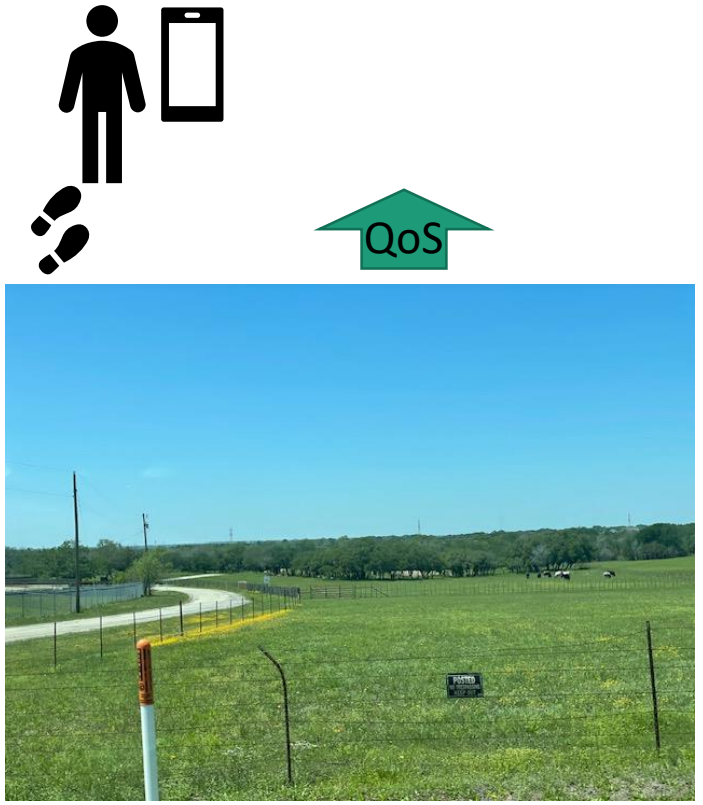
Should we exclude reports of low QoS?

Some APs may not be frequented by WiGLE users.



For more reliability - WiGLE QoS Score

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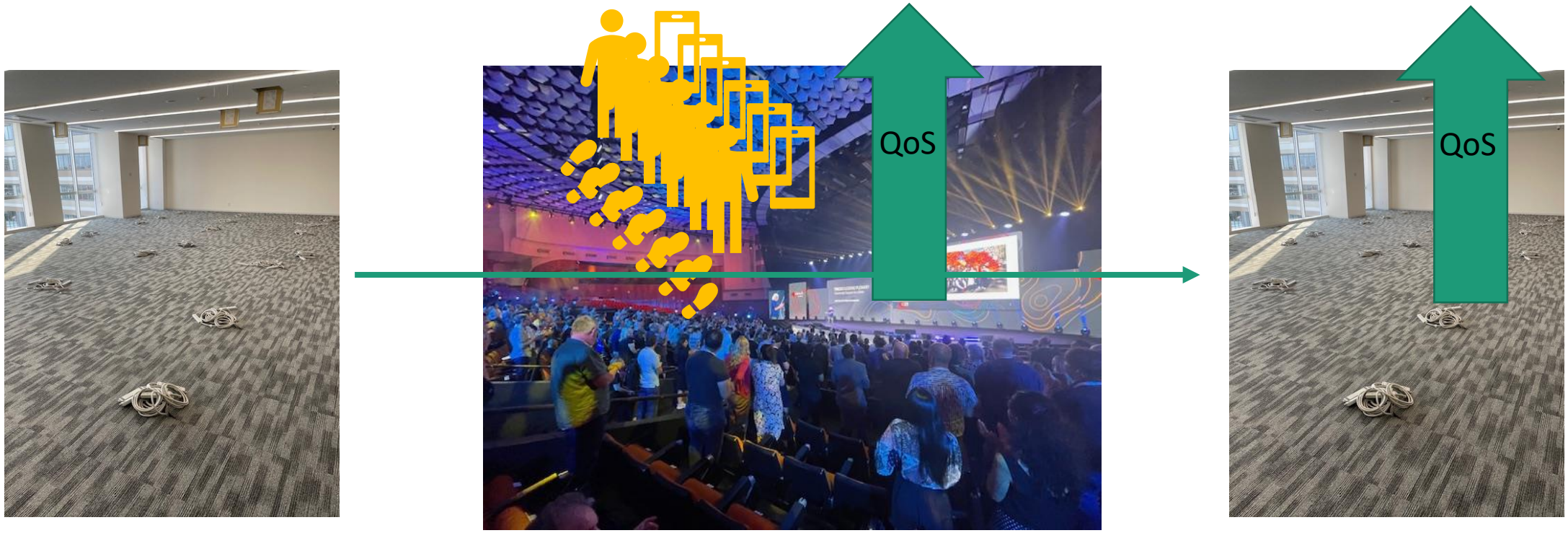
How about like temporary conference Wi-Fi AP? (like WGC)

Remains with high QoS scores even after APs are removed.

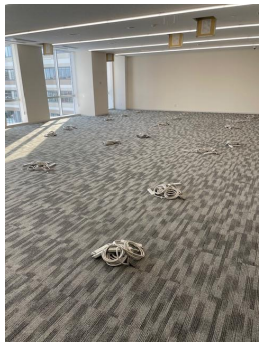


For more reliability - WiGLE “lastupdt”

Filter points by how recently they've been updated (more recent than this value), condensed date/time numeric string format 'yyyyMMdd[hhmm[ss]]'

9 June 2023

Setting lastupdt to more recent would exclude Wi-Fi APs from past events.



10 June 2024

But WiGLE users are not hanging around everywhere at all times.

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I haven't come up with a good idea yet that would solve everything.

But like as eduroam's AP location reports from SPs in JAPAN are not complete,
Cityroam also does not receive complete AP location reports.
(off course should be complete , with current rule.)

It would be difficult to eliminate the need for reporting from SPs,
but some form of supplementary WiGLE-like data could be utilized in the Map.

#1 - Successful discovery of APs in foreign countries

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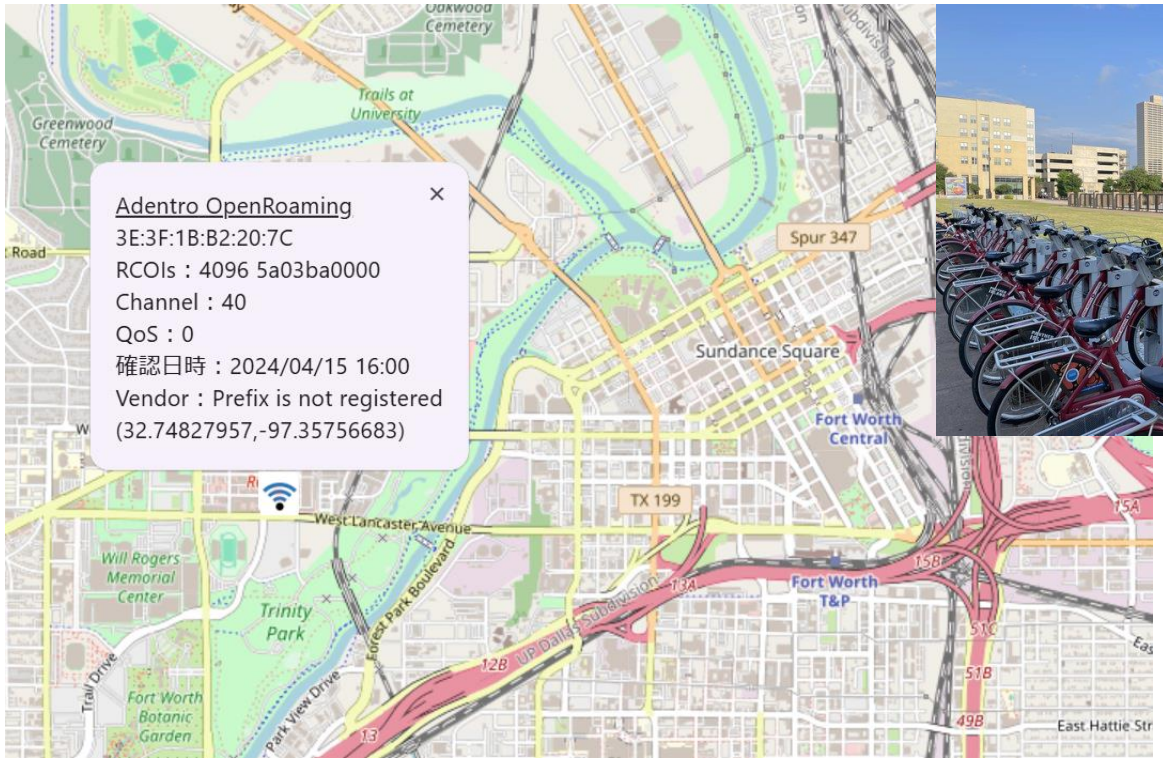
I want to discover and try OpenRoaming base stations in a foreign country.
But money and time are very limited and opportunities are few.



Fort Worth, TX, US

AT&T SIMs can join in OpenRoaming, even within the United States.
However, for some reason I could not connect with the Cityroam ANP profile.

#2 – We can keep watch my local

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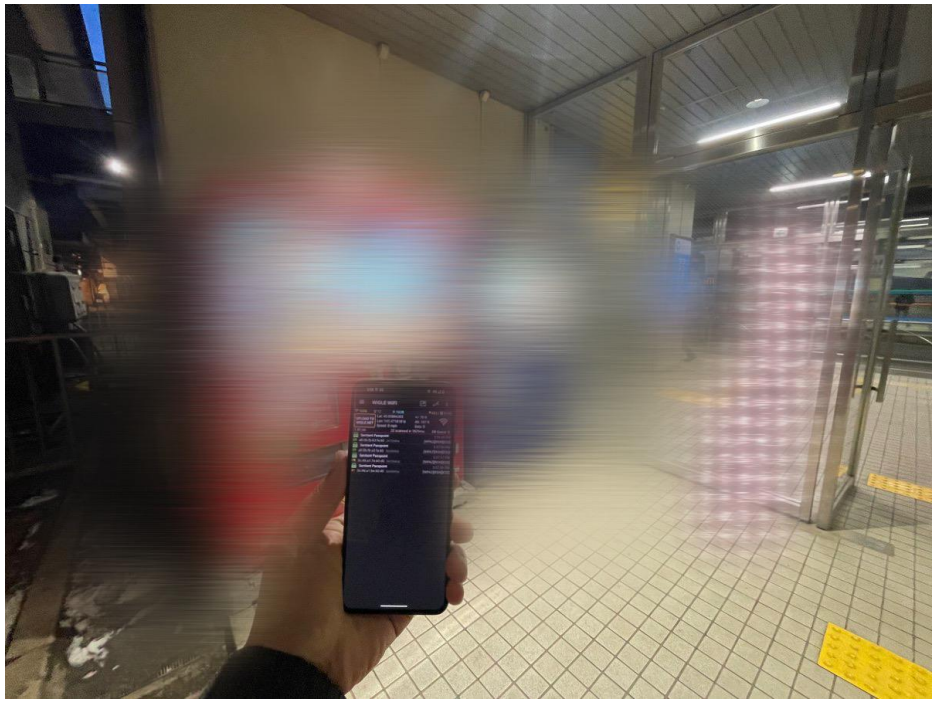
My local - One operator was found in the MAP to be sending OpenRoaming RCOIs even though it does not actually provide OpenRoaming services.



The user's client would see the RCOI and try to connect automatically, but could not connect, so the user experience was compromised.

We attempted to contact the operator ourselves but no response, so we reported the matter to the WBA, and WBA discussed with them.

As a result, the advertisement of 5A03BA0000 (OpenRoaming-Settlement-Free) was suspended.

#3 - Abnormal value finding

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1) Some APs are not advertising RCOIs.
 - Incorrect settings
 - bug in the AP

2) SSID: eduroam should not advertise OpenRoaming RCOI,
but is incorrectly set.

Cityroam is asking such SPs to fix.

Scripts

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WiGLE AP fetch script
https://github.com/pirosap/get-wigle-data/

MAP https://pirosap.github.io/cityroammap/