

Accelerating OpenRoaming adoption: Cityroam's deployment strategies with OpenRoaming and eduroam

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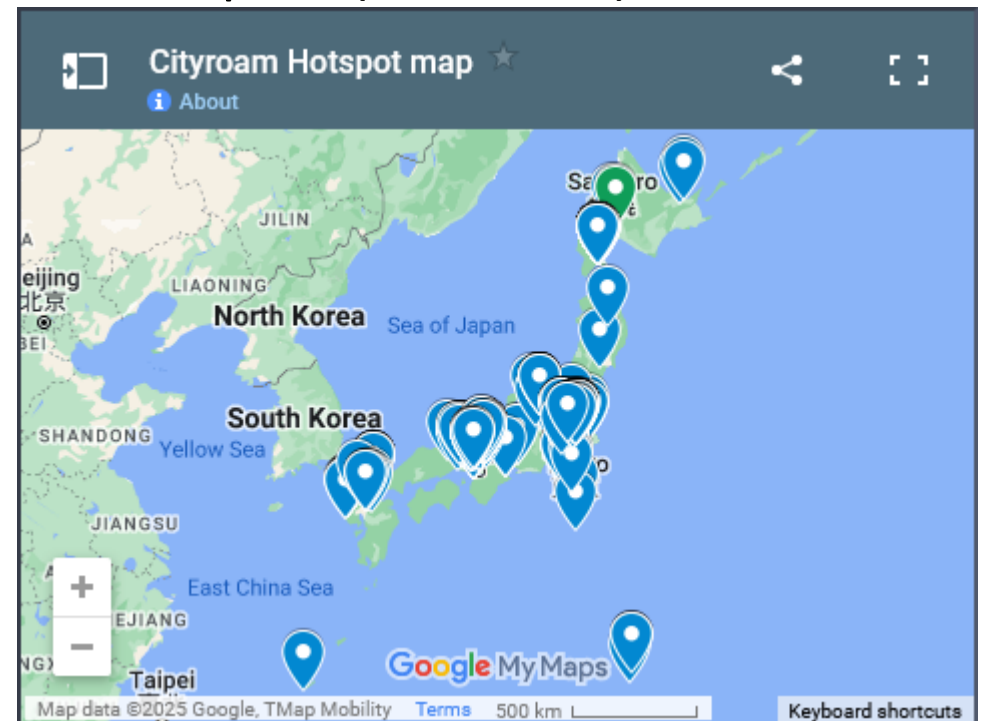
Nationwide Cityroam deployment in Japan

- Cityroam, a federation providing secure roaming system for Public Wi-Fi since 2018.
- All sites provide both **eduroam** and **OpenRoaming** (2020-).
- **Unique sites** across the nation.



cityroam

1000+ spots (Jan. 2025)



WBA OpenRoaming




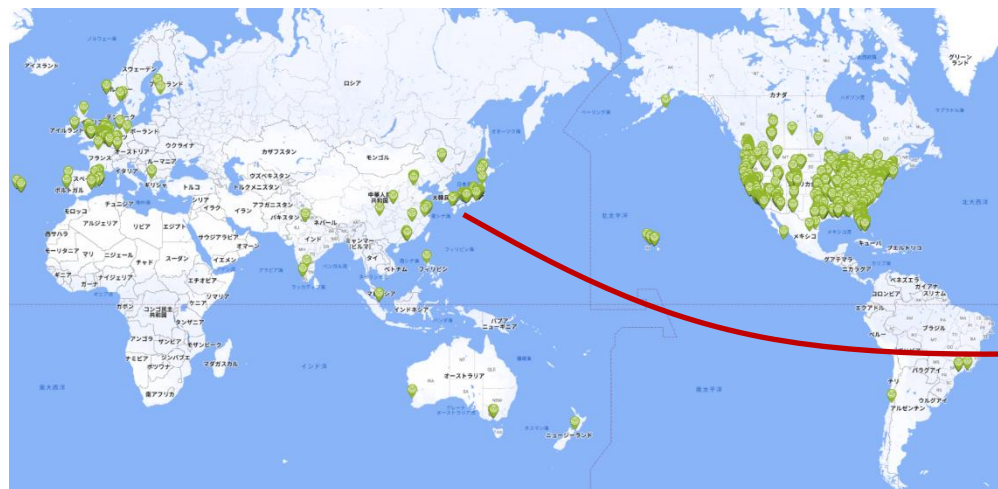
- **Seamless connection experience for everyone.**
eduroam-like, but not limited to Research&Education community.
 - eduroam since 2003, now 100+ countries/territories.
- **Advanced and multipurpose** than eduroam (RFC 7593).
- Based on Passpoint and WRIX framework.
- PKI and RadSec + Dynamic Peer Discovery
 - Similar to eduroam, but in larger scale.
- Two policies using different RCOIs
 - Settled: Accounting and intermediary are required.
 - **Settlement-free: No roaming fee. Much easier adoption.**

Fit with our purposes.

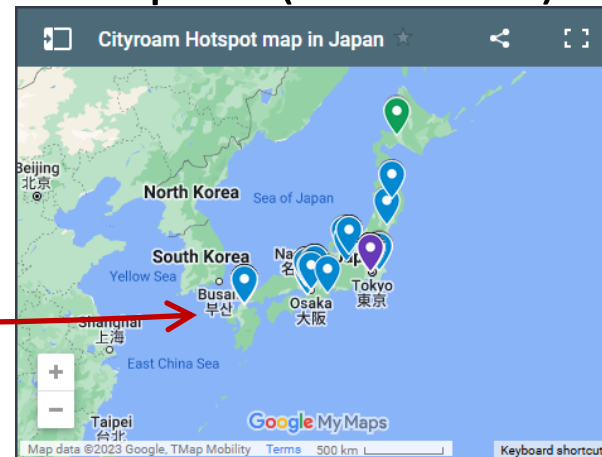


Cityroam's rapid growth – why?

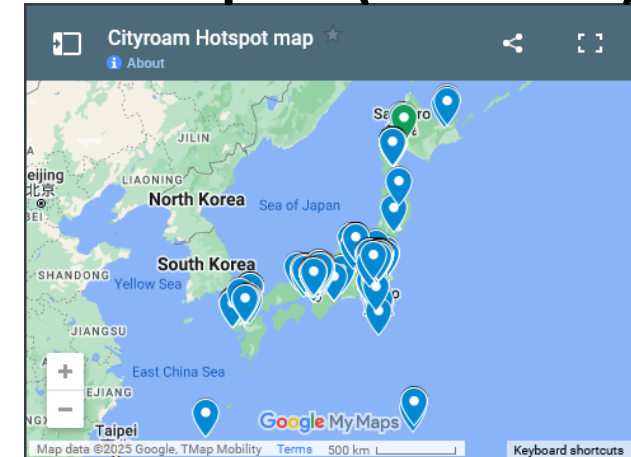
- Organized a Roaming Federation
 - **Community supports** (seminars, tech tests & discussions, etc.)
 - → **Wireless Identity Federation Association** (est. Apr. 2024)
- **Affordable roaming platform** with **Simplified inter-connections** (central hub).
 - IdP: eduroam, Cityroam Cloud IdP, operators in Japan, telcos/ISPs and cities overseas via 
- eduroam/OpenRoaming combined architecture
- **Involvement of Municipal Wi-Fi** (multi-vendor, multi-operator scheme)



90+ spots (Jan. 2023)



1000+ spots (Jan. 2025)



Cityroam sites – early adopters of OpenRoaming



Co-working space in Morioka
(OpenRoaming was added
in 2020)



Conference Center in Nagano
(May 2021)



Hot Spring facility in Nagano
(May 2021)



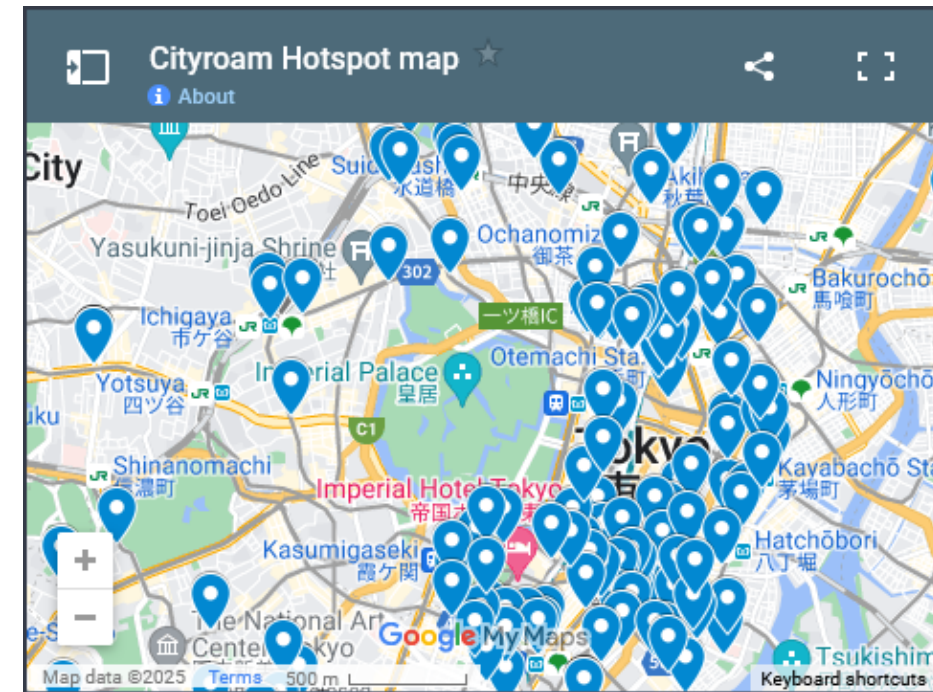
Resort Hotel & Complex in Ise
(Feb. 2022)



Vending machines in
Kyoto City Parks
(May 2020)

TOKYO FREE Wi-Fi supports OpenRoaming

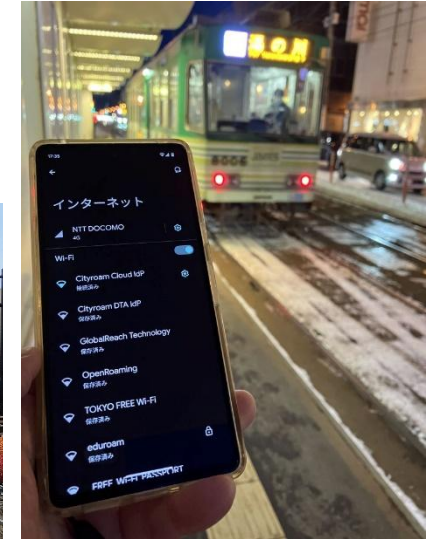
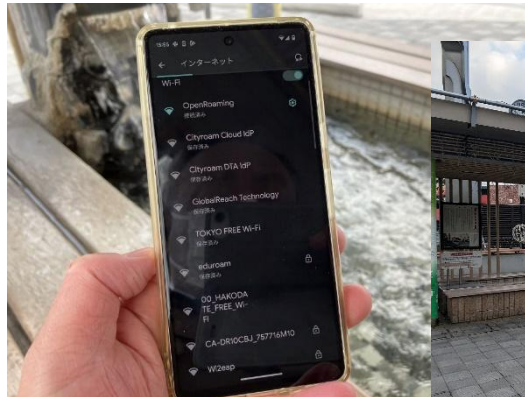
- Released on Mar. 31, 2023
- Tokyo Metropolitan Government + KDDI / Wire & Wireless (Wi2)
- Enhanced security, safety, and usability. 😊



<https://wi-fi.metro.tokyo.lg.jp/en/>

HAKODATE FREE Wi-Fi

- Nov. 30, 2023 –
- eduroam and OpenRoaming become available.



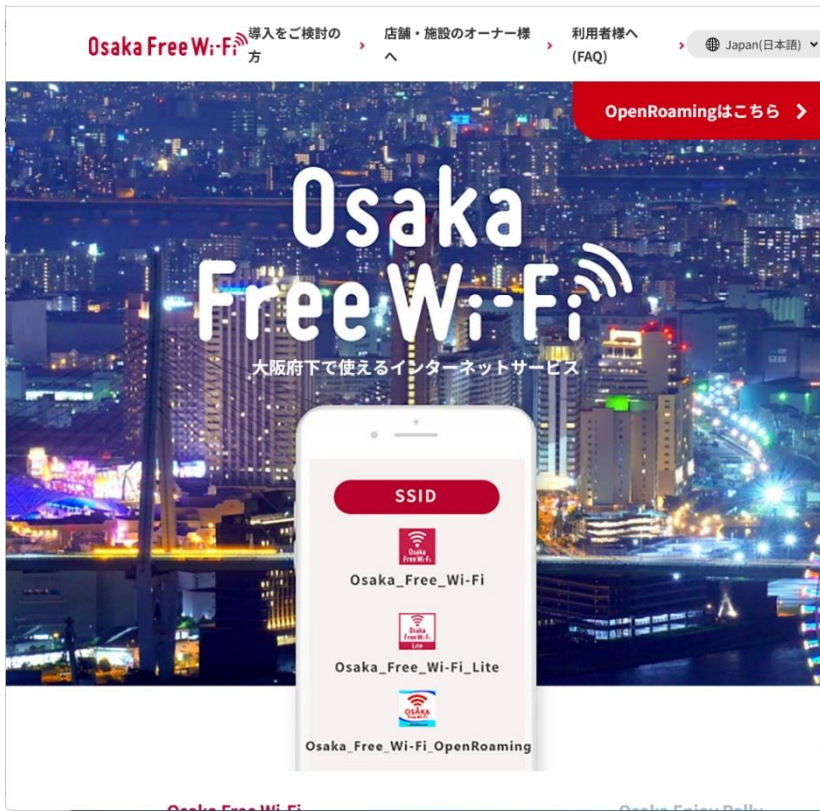
Enjoy eduroam / OpenRoaming at the footbath (hot spa), airport, trams !

https://wi2.co.jp/release/press/2023/20231130-hakodate_openroaming.html



Osaka Free Wi-Fi

- Oct. 10, 2024 –
- Initial deployment focuses on Public Transport. (for EXPO 2025)



<https://ofw-oer.com/>

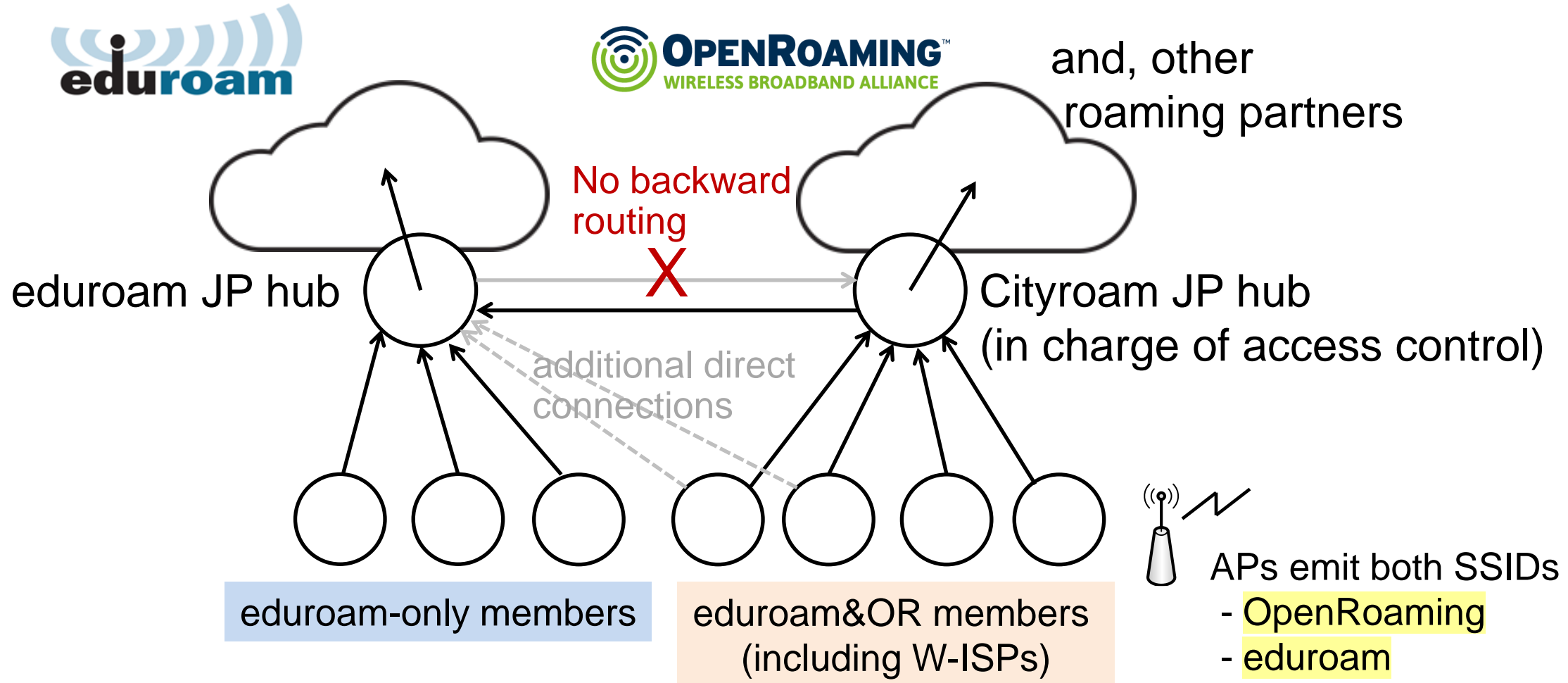


Why eduroam/OpenRoaming combination?

- eduroam has a matured **autonomy**.
 - Virtually monolithic.
If you see “eduroam” SSID, **the service is always there.**
 - Single basic policy + minor variants.
(won't bother users so much)
 - eduroam can be “**a group of reliable IdPs**”
that provides good credentials with strict user verification,
probably accompanied with enlightenment.
- Many students and staff are carrying devices already configured with eduroam.

Great
advantage

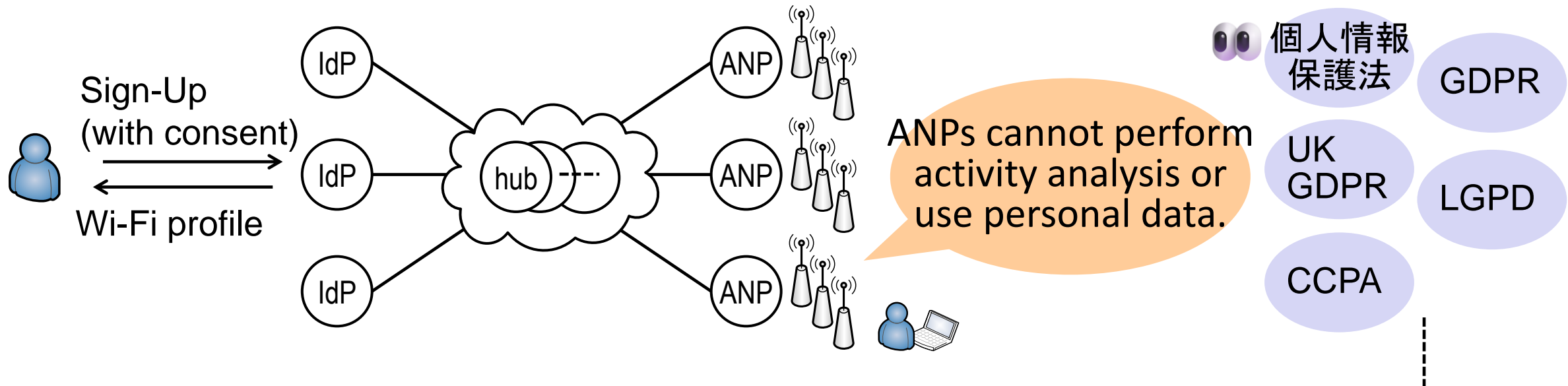
eduroam/OpenRoaming combined architecture



Forward to eduroam if ("`%{Called-Station-Id}`" =~ `/:eduroam/`)
(e.g. `Called-Station-Id = de-ad-be-ef-01-23:eduroam`)

Challenges in user activity analysis and data usage

- IdP and ANP are separated.
- **ANPs cannot see “real user ID” or obtain user’s consent.**
 - Outer-Identity is anonymized, e.g. **anonymous@example.com**
Inner-Identity is protected by EAP tunnel from ANPs.
 - EAP-TLS (with TLS 1.3) hides **the contents of Client Certificate.**
 - Ephemeral MAC addresses, etc.



ANP: Access Network Provider
EAP: Extensible Authentication Protocol

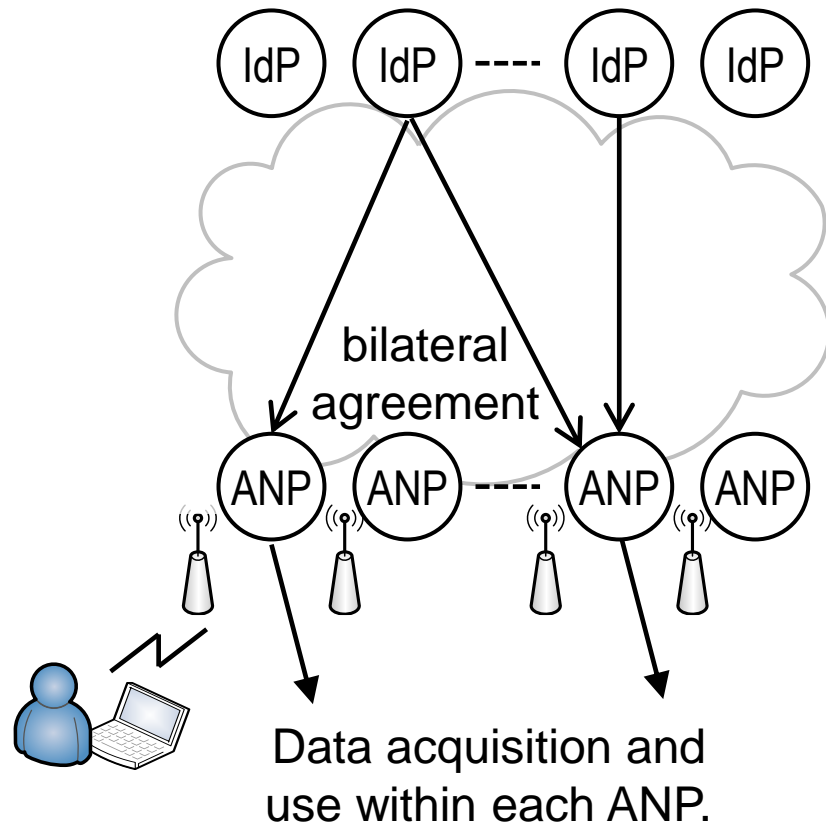
Development of a user data sharing system

- Owners want to know / do ...
 - Age group
 - Gender
 - Nationality
 - Language (browser setting)
 - Device/OS (for app development)
 - Wi-Fi usage location and staying time
 - Travel routes (e.g. shop-hopping in a mall, tourist sites), etc.
- Especially, municipalities want to know / do ...
 - Travel routes
 - Analysis of tourist sites
 - Analysis for disaster response / mitigation, and urban design



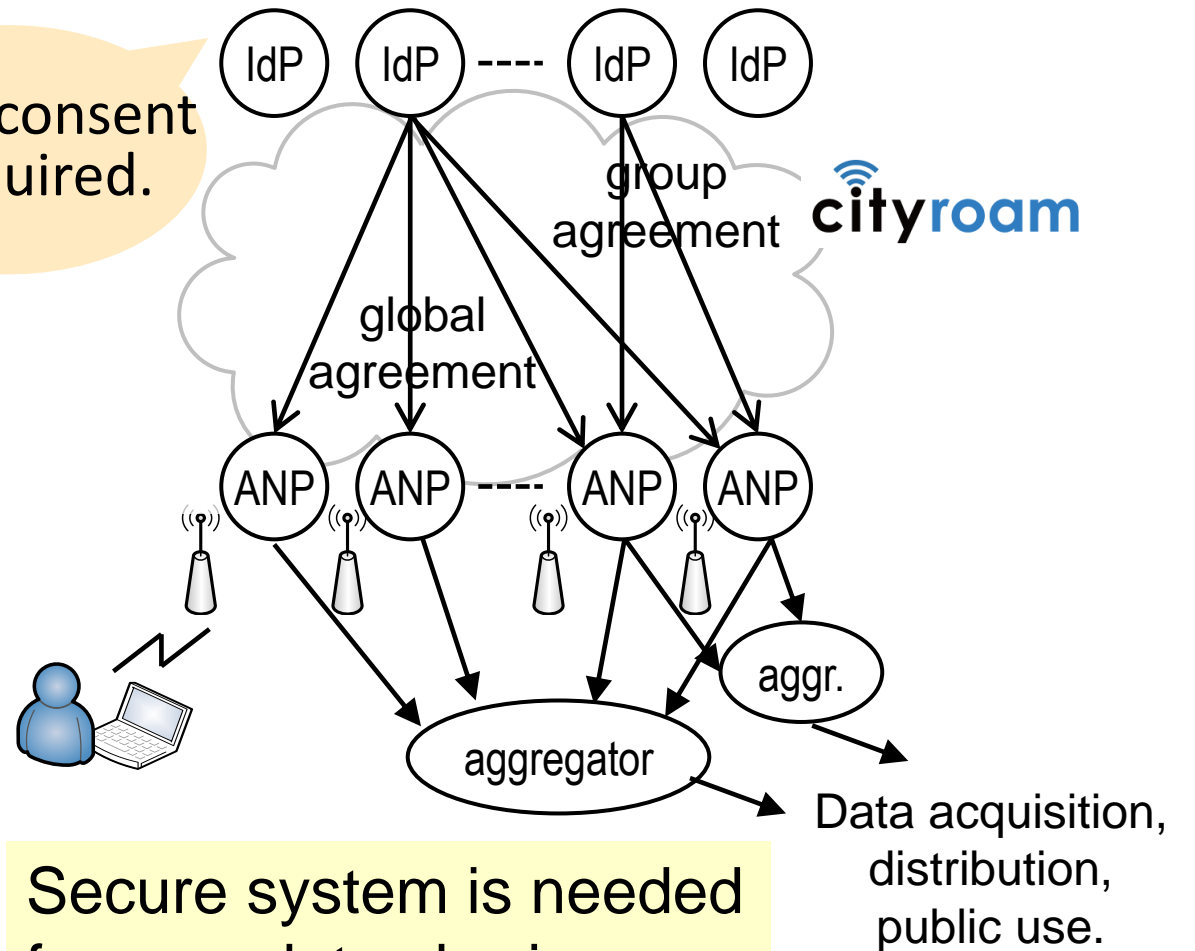
Important data
for businesses

Development of a user data sharing system



Bilateral agreements lead to low scalability.

User's consent is required.



Secure system is needed for user data sharing.

A part of this work is supported by a commissioned research program at National Institute of Information and Communications Technology (NICT) in Japan.

Our key success factors

- Community supports by the Cityroam Federation
- Involvement of Municipal Wi-Fi
- “Support for R&E” is attractive for municipalities.
- Simplicity + Managed systems
- Utilize existing identities
 - eduroam, SIM, device-built-in OSU, and Social Accounts

Our next step

- Develop secure methods for user data sharing under user’s consent.
- Develop a nation-wide system and encourage owners to adopt Cityroam (and OpenRoaming).